MARCH, 1943

Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

ROTARY KILNS

OUR KILNS
ARE USED IN
PLANTS MAKING
MAGNESIUM
MANGANESE
ALUMINUM
DOLOMITE
CEMENT
ALKALI
NICKEL
LIME
IRON
TIN

F. L. SMIDTH & CO.

60 EAST 42ND STREET

ENGINEERS AND
MACHINERY MANUFACTURERS

NEW YORK, N. Y.

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WILLIAMS TO THE FRONT

The "SLUGGER" Crushes One Man Size Stone to 1¼", ¾" or Agstone in ONE OPERATION

SPEED plus satisfactory work is essential in America today. Along these lines the Williams "Slugger" Crusher and Pulverizer now makes it possible to crush large pieces of stone weighing from 75 to 100 pounds to 1¼", ¾" or agricultural limestone in One Operation. This not only eliminates costly sledging but also does away with the unnecessary expense of a primary crusher.

The "Slugger" represents the most advanced type of crushing equipment on the market today and with seven sizes to choose from producing from 4 to 30 tons per hour, every producer whether large or small can now afford to install a Williams.

The Williams Patent Crusher & Pulverizer Co.
800 St. Louis Avenue — St. Louis, Mo.

SLUGGER FEATURES INCLUDE

- **MANGANESE STEEL HAMMERS.** Heavy duty slug end hammers are standard equipment in the "Slugger."
- **HAMMER ADJUSTMENTS OVERCOME WEAR.** Discs are arranged so that the hammers can be set out as they wear on the end.
- **MANGANESE STEEL ADJUSTABLE BREAKER PLATE.** Adjustable towards the hammers.
- **ELECTRIC STEEL FRONT END.** The part which holds the breaker plate is electric steel cast—3½ times stronger than cast iron.
- **COVER AND SIDE LINERS 1" THICK.** Manganese steel liners.
- **SEVEN SIZES.** 30 to 150 horsepower, stationary or portable models.

Williams Fine Grinding Equipment With Air Separation . . .

For faster, more efficient fine grinding of limestone, lime, coal, talc, etc., there is a Williams Roller Mill with Air Separator to fit your requirements. Finenesses from 100 to 400 mesh.

Williams also builds Impact Mills with Air Separation; Mechanical Air Separators for classifying finely ground material or taking the fines out of dry material.

WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS MO. U.S.A. THE TRADE MARK

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Williams

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

PATENT CRUSHERS GRINDERS SHREDDERS

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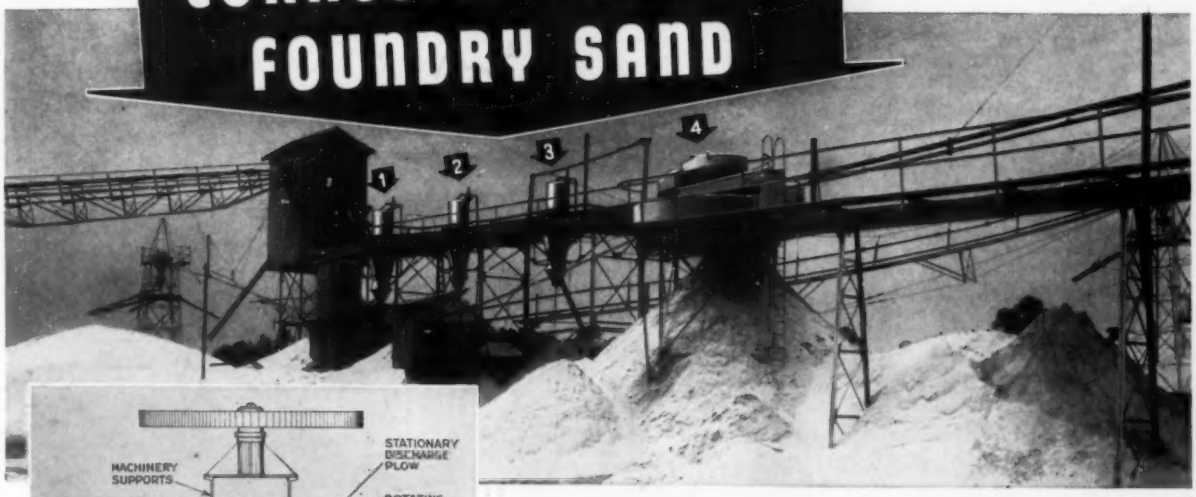
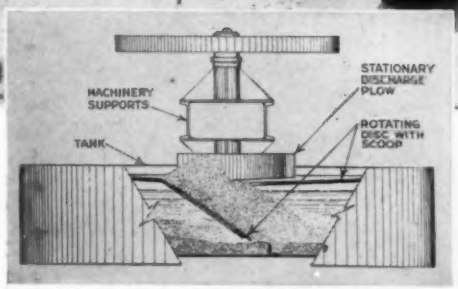
CORRECTLY GRADED FOUNDRY SAND





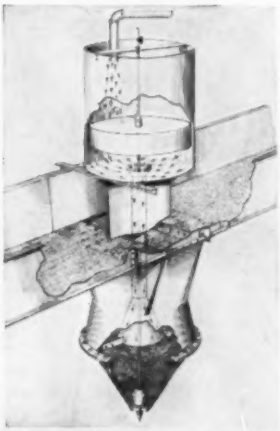
Produced By LINK-BELT CLASSIFIERS At Newest Whitehead Plants

THE ROTOSCOOP

is an unusually efficient, highly flexible, self-contained, compact dewatering unit for all types of sand. It provides a simple method of recovering special grain sizes usually lost in the overflow water. Delivers sand dry enough for loading on trucks or conveyors. Made in four sizes—15′, 12′, 9′ and 6′ diameters, with capacities 20 to 150 tons per hour.

THE SHAW CLASSIFIER

This unit will not only produce clean commercial sand but will also make such special grades as asphalt, filter, engine, gypsum and glass sands. Sand graded and cleaned by this unit will meet the most exacting specifications, particularly where removal of fines is important.



The newest sand preparation plants of the Whitehead Brothers Company at Dividing Creek, N. J., are outstanding examples of modern equipment doing a vital wartime job with precision and economy. The Number One plant, shown above, is capable of producing seven grades of sand to A.F.A. standards with three Link-Belt Shaw classifiers and a Link-Belt Rotoscoop. The 30-inch classifier (1 in illustration) can be adjusted to produce three grades, the 24-inch classifiers (2 and 3), and the 12-ft. Rotoscoop (4), produce one grade each, while the overflow from the Rotoscoop, held in a settling basin, recovers a very fine grade.

The Number Two plant uses two Link-Belt conical screens for scalping over-14-mesh material. In the two drying plants, Link-Belt vibrating screens receive sand discharged from the dryers and operate as stationary or vibrating screens.

LINK-BELT COMPANY

Chicago Indianapolis Philadelphia San Francisco Atlanta Dallas
Toronto. Offices, warehouses and distributors in all principal cities

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LINK-BELT

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Rock Products

Volume 46 • March, 1943 • Number 3

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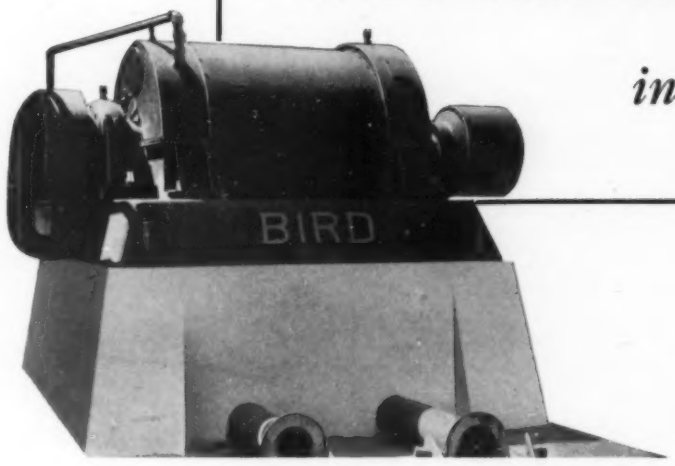
OVER TWO MILLION BARRELS

of cement have been processed

WITH ONE BIRD CLASSIFIER

in a single year



With the Bird Classifier you can retain all the process advantages of any other classification system, *plus*

1. **Sharp, accurate classification with feed slurries at ball mill consistency.**
2. **Classified fines fed directly to the kiln without thickening or filtering, and no increase in fuel requirements.**
3. **No need of altering your process with the Bird. Clay can be added to the grinding circuit before classification, insuring complete mixing before burning.**
4. **Classification carried out with minimum space requirements. A Bird capable of handling a ton of cement per minute requires only 130 sq. ft. floor area.**

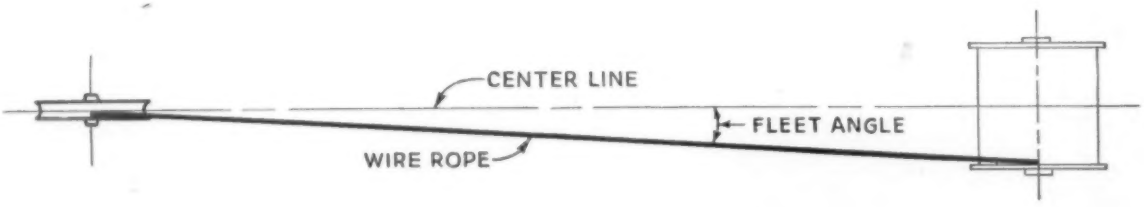
Why not get the whole story? For full information about the Bird Continuous Centrifugal Classifier and what it can do, write

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Keep fleet angles under 3 deg.

for best service from wire rope



The "fleet angle," illustrated above, is an important consideration when locating a main sheave in reference to a winding drum. If this angle is too large, there will inevitably be side-wear on the rope as it passes diagonally from the outside edge of the drum across the sheave.

Experience has shown that best results are obtained when the fleet angle is not greater than 1½ deg., with a smooth-faced drum, and not greater than 2 deg. with a grooved drum. When the fleet angle exceeds a maximum of 3 deg., wire rope service life is materially reduced. If these recommended fleet angles are followed, you will get a lot of extra service from wire rope.

Another worth-while maintenance precaution is proper alignment of sheaves. Proper sheave alignment seems like such a small matter that it may be overlooked in busy times—yet it can add greatly to wire rope service life.

To line up two sheaves properly, simply adjust them so that the rope runs straight from one to another and seats squarely in the center of each sheave groove. Even a slight misalignment can cause a great deal of wear between the rope and the shoulder of the sheave.

On certain types of work it is well to check sheave alignment from time to time during operation, to catch and correct any deviation from true alignment. For example, on timber-mounted drag-scrapers and slack-line excavators, the sheaves are apt to slip out of alignment due to a loosening of the mounting in the wood.

Mining machines—loaders, slushers and tugger hoists—should also be frequently inspected. Wire rope that operates in a mine is subject to severe wear under the best of conditions. Help the rope with maintenance precautions, wherever possible.

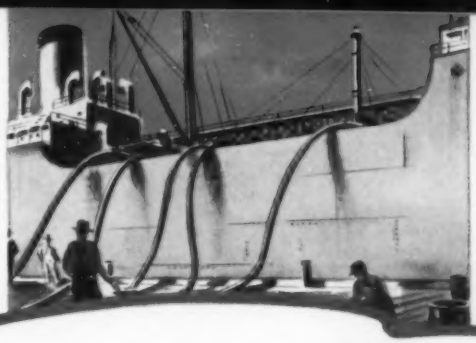
A third practical suggestion is to inspect the wire-rope system of clam-shell buckets for wobbly sheaves and to replace worn sheave bearings or worn axles where necessary. A wobbly sheave, or a badly worn sheave, can greatly reduce the service life of a wire rope.

Bethlehem Wire Ropes for all Purposes

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Synthetic rubber facilitates well drilling. MANHATTAN oil-proof Rotary Hose and Molded Products, long used in all important fields. Tanker time is saved by use of synthetic rubber in Paranite G.O.P. Oil Hose.



Long before Singapore

Synthetic rubber's most vital use in airplanes—for fuel and cont bose, in molded diaphragms, and motor packings, of which MA HATTAN is a principal supplie

Air-operated tools deliver steadier service with longer hose life when hose is lined with G.O.P. synthetic rubber.

Paint spraying speeds delivery of combat equipment. Only synthetic rubber resists action of paint and varnish.

Trucks, buses, tanks and jeeps, all have scores of oil-proof synthetic rubber parts to keep 'em rolling.

MANHATTAN was a Veteran in the use of *Synthetic Rubbers*

For years before the fall of Singapore, the use of several varieties of synthetic rubber was well established in the manufacture of the products illustrated. These synthetic rubbers had special properties not possessed by natural rubber, such as: resistance to oils, sunlight and heat.

Because natural crude rubber was satisfactory, plentiful, and the supply seemed safe (Singapore was considered impregnable), no major (and costly) research and development programs to perfect and supply synthetic rubbers as a substitute had been initiated.

Under today's rising and tremendous program, widely publicized, vast quantities of *all-service* synthetic rubbers will be produced in months to come to replace natural crude rubber. Differences in physical characteristics, not easily recognizable to the layman, but of profound significance to the rubber technician, present highly diversified problems in the art of compounding and using these new *all-service* synthetic rubbers.

The accumulated experience of all manufacturers in the use of special-type synthetic rubbers is proving very valuable in building up the art of substituting these new synthetic types for natural rubber. The full and free interchange of information, fostered by Washington and the Industry, is speeding the results at a pace which should confirm confidence in the ability and talent of the Industry to turn out good, usable, often better, products for War and essential civilian needs.

MANHATTAN expects to further its already substantial contribution to this tremendous program of development through extensive facilities, engineering talent and a long and comprehensive experience in the use of special-type synthetic rubbers in its Paranite —G.O.P. products.

50th YEAR OF RESEARCH

Pioneering in the developments and applications of synthetic rubbers was a natural sequence to the continuous program of research which has been inherent with MANHATTAN throughout the 50 years of its progress. To the long series of contributions to Industry, more will be added.

THROW YOUR SCRAP INTO THE SCRAP!

KEEP AHEAD WITH MANHATTAN

THE MANHATTAN RUBBER MANUFACTURING DIVISIOI
of RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES PASSAIC, NEW JERSE

To Help You Increase Production and Save Steel . . . *Consider* TDA

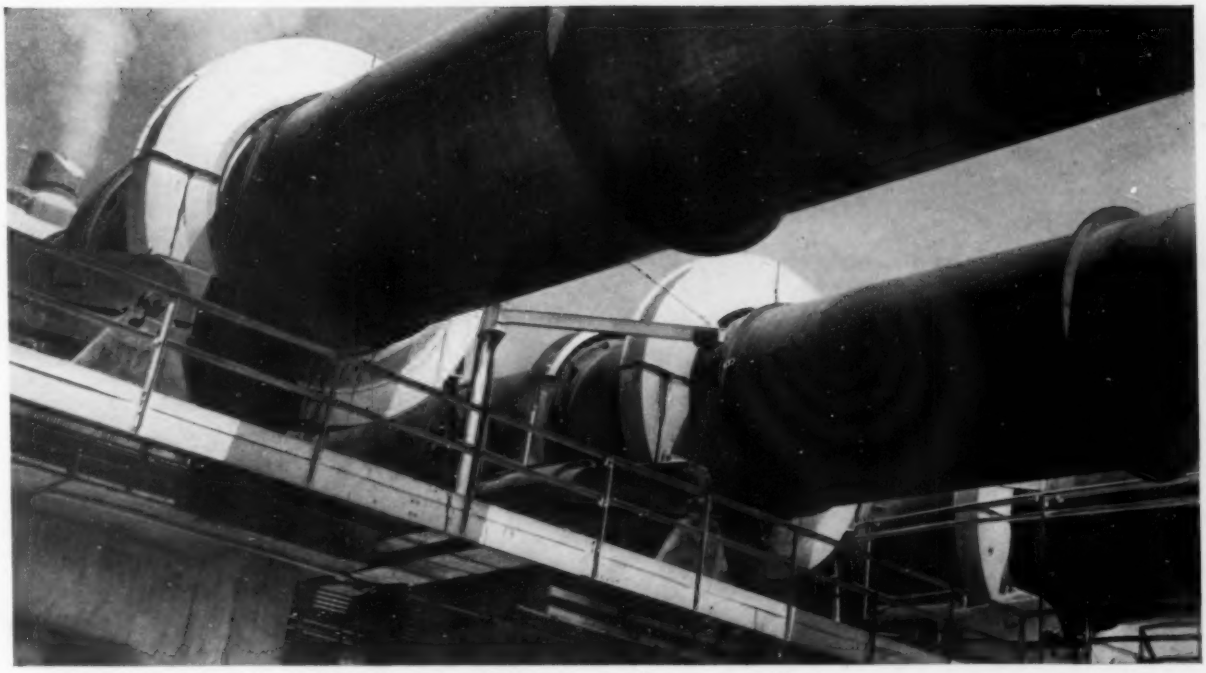
TODAY more than sixty United States cement plants have increased production rates from 15% to 50% with TDA, the amount of increase depending upon the fineness of the finished product. At only four out of more than eighty plants where it has been tried has TDA failed to produce a 15% or better increase in production rate, even at the lower surface areas. We believe that TDA can increase the mill production rates of most of the remaining plants sufficiently to pay for itself and show appreciable savings.

Equally important today is the saving in steel grinding media which comes as a bonus when using TDA. Because TDA increases the ratio of impact to attritional grinding, the saving in steel is even more striking than the increased production rate. In short, TDA helps you contribute to the war effort both by a higher production rate and by conserving steel, at an appreciable saving to yourself.

Consider your consumption of grinding media for 1942. Compare it to the average of three of the cement manufacturers who use TDA in all their production and who produced, in 1942, a total of more than 8,000,000 barrels of cement at an average grinding media consumption of .015 pounds per barrel. And 43% of this cement was either high early strength, modified, or low heat. The average increase in production rate for the three plants (excluding high early strength) was 22%. Commonly used types of grinding media were employed at all three plants.

Perhaps TDA will not reduce your grinding media wear from your present figure to .015, but our experience indicates that a considerable saving may result. We feel that a 25% saving in steel is a conservative average, even at surface areas in the 1500-1600 $cm^2/gm.$ range. Isn't this worth investigating? Our engineers will be glad to cooperate in every way in discussing your particular problem. Write Dewey and Almy Chemical Company, 82 Whittemore Avenue, Cambridge, Massachusetts.

DEWEY AND ALMY CHEMICAL COMPANY, Cambridge, Massachusetts



TRAYLOR

KILNS ★ COOLERS ★ DRYERS

—THE STANDARD

WE BUILD

Rotary Kilns
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Rotary Dryers
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Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

The photograph above shows three of a large battery of Traylor Rotary Kilns in one plant of one of America's greatest process companies, which has fixed upon Traylor Kilns as the standard for all of its operations. This is only one of a great many companies that have adopted the same policy.

The reason—Traylor Rotary Kilns are more than mere assemblies of so many tons of steel plate, other tons of steel and iron castings and varying quantities of miscellaneous materials. Built into each machine are many ideas, represented by various devices to increase efficiency and decreasing costs—ideas based upon an intimate knowledge, on the part of our engineers, of the work it must do, knowledge gained by constant observation and study.

As a result, Traylor Rotary Kilns—and Traylor Rotary Coolers and Dryers, too—have come to be recognized as units that can be completely relied upon, by the engineers and operators of cement and lime manufacturing plants, chemical plants, mining plants, and other process industries. So, quite generally, "how soon can you ship?" is a more frequent question than "how much will it cost?"

We invite engineers and operators who do not know Traylor Rotary Kilns, Coolers and Dryers to use our facilities for help and advice. Write us, today!

SEE OUR BULLETIN No. 115

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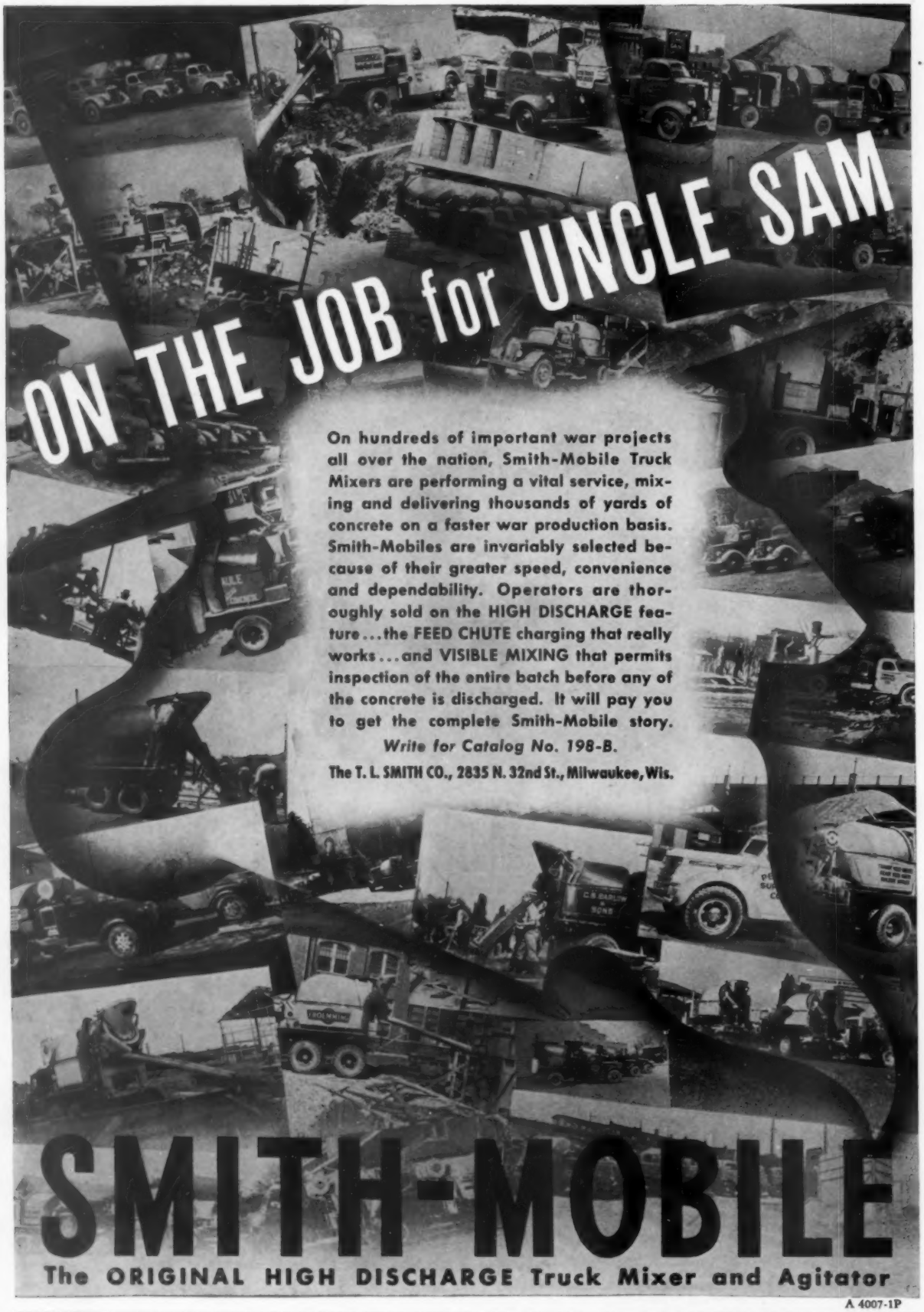

ON THE JOB for UNCLE SAM
On hundreds of important war projects all over the nation, Smith-Mobile Truck Mixers are performing a vital service, mixing and delivering thousands of yards of concrete on a faster war production basis. Smith-Mobiles are invariably selected because of their greater speed, convenience and dependability. Operators are thoroughly sold on the HIGH DISCHARGE feature...the FEED CHUTE charging that really works...and VISIBLE MIXING that permits inspection of the entire batch before any of the concrete is discharged. It will pay you to get the complete Smith-Mobile story.
Write for Catalog No. 198-B.
The T. L. SMITH CO., 2835 N. 32nd St., Milwaukee, Wis.
SMITH-MOBILE
The ORIGINAL HIGH DISCHARGE Truck Mixer and Agitator

A 4007-1P

What Steel Company First Made Hadfields Manganese Steel in America?

Sir Robert A. Hadfield

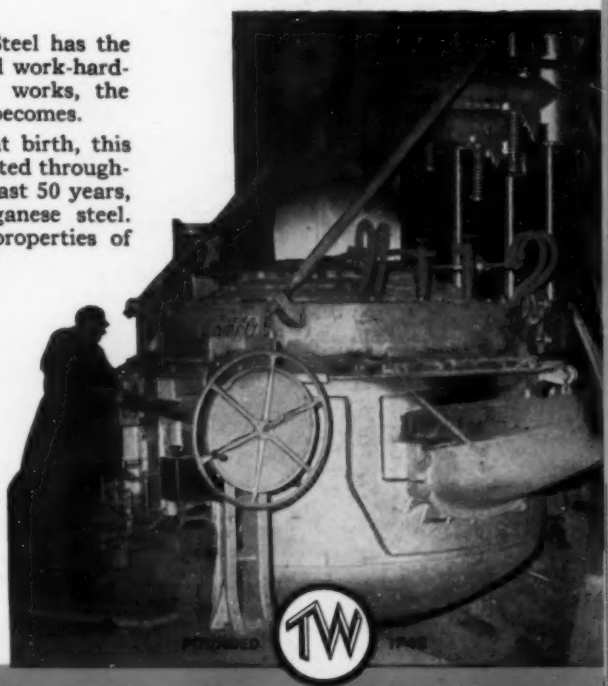
TISCO-*First* in Manganese Steel!

ON October 29, 1892, the first heat of Manganese Steel in America was poured at the High Bridge, N. J. plant of the Taylor Iron & Steel Company (now Taylor-Wharton Iron & Steel Co.) as sole U. S. patent licensee, under the personal direction of Sir Robert A. Hadfield, originator of that remarkable steel.

This great development brought to American industry a steel of unequalled toughness and durability for severe conditions requiring resistance to heavy impact and abrasion. Among its useful applications are railway frogs, crossings and switches —grinding and crushing equipment —power shovels, dredges, etc.

Hadfields Manganese Steel has the unique property of cold work-hardening. The harder it works, the more wear-resistant it becomes.

Christened "TISCO" at birth, this name has become accepted throughout the world for the past 50 years, as the finest of manganese steel. Today, the valuable properties of TISCO Manganese Steel, and the technical skill and modern facilities of our two plants are now serving 100% in this country's war effort.



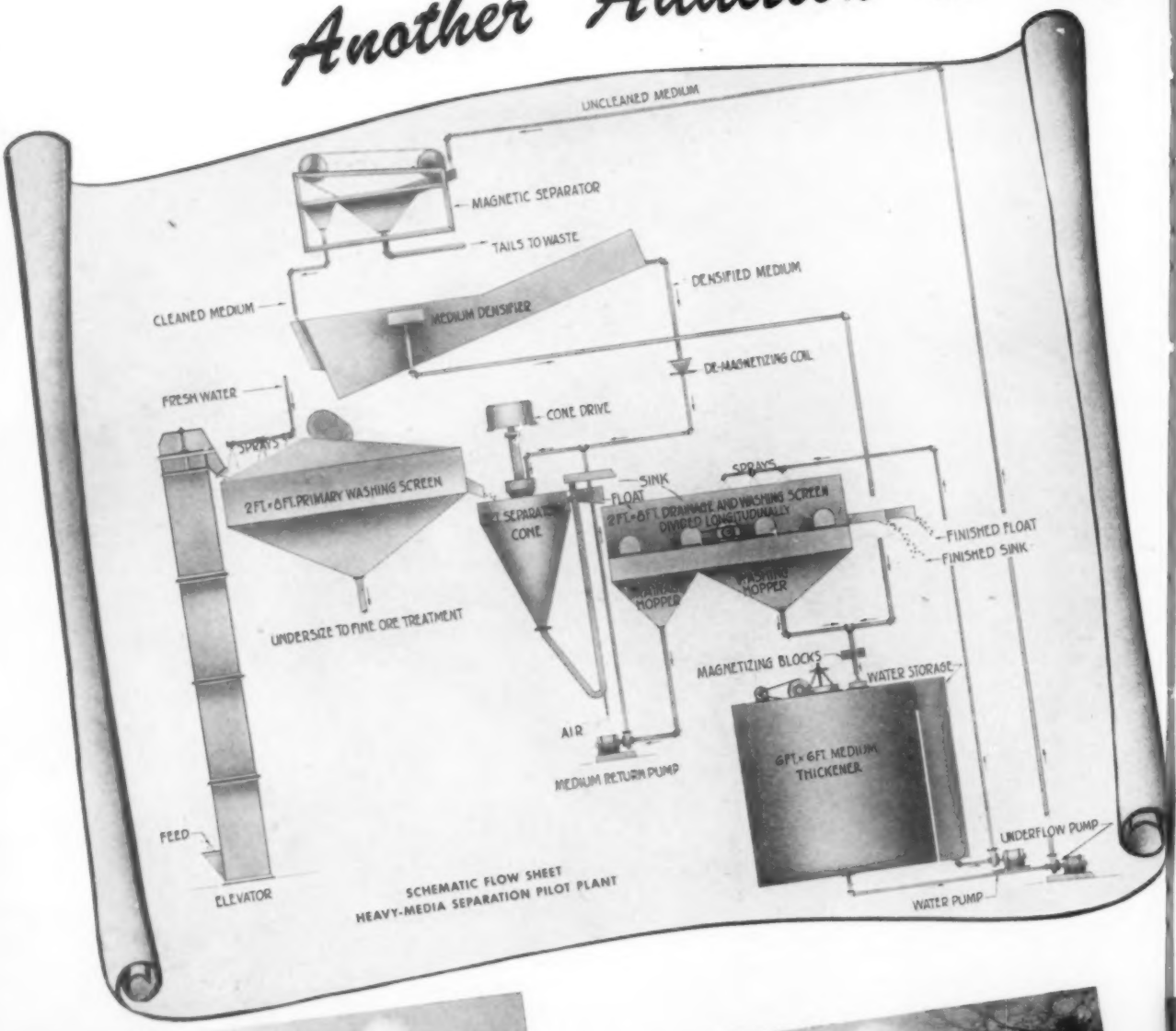
Shown at top is a 3-ton bottom blow converter used for many years. Right; Modern electric melting furnaces used today.

Left: TISCO Manganese Steel jaw crusher parts.

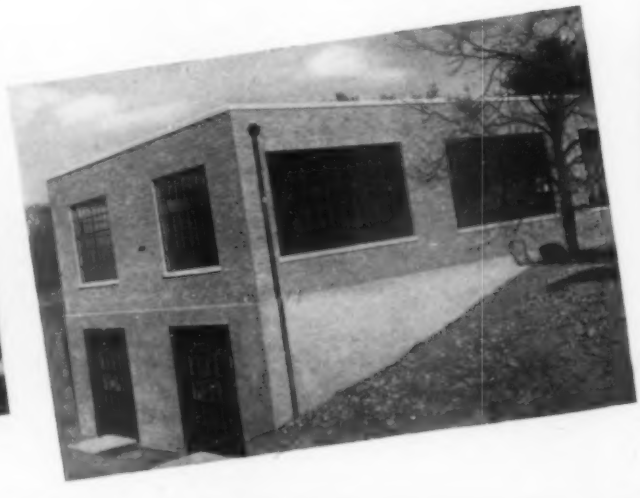
Taylor-Wharton Iron & Steel Co.

HIGH BRIDGE, NEW JERSEY • EASTON, PENNSYLVANIA

Another Addition to the



SCHEMATIC FLOW SHEET
HEAVY-MEDIA SEPARATION PILOT PLANT



AMERICAN CYANAMID COMPANY

Cyanamid Ore Dressing Laboratory

New Heavy-Media Separation Pilot Plant Available for Continuous Testing

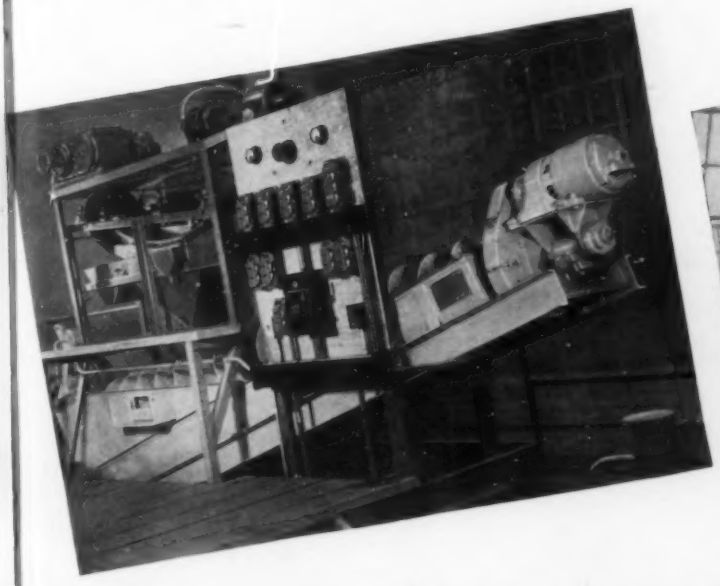
To extend the economic application of Heavy-Media Separation (Sink-Float) by providing an accurate forecast of actual plant results in the treatment of metallic and non-metallic ores, Cyanamid has expanded its Ore Dressing Laboratory facilities to include a continuous pilot plant.

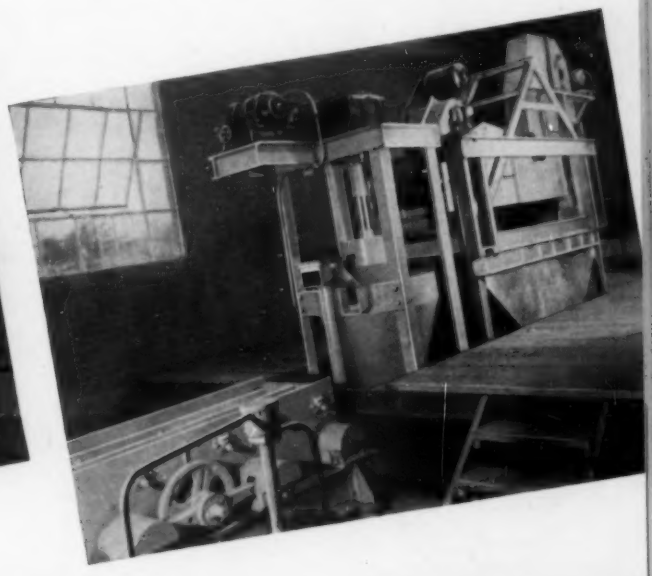
Housed in a specially constructed building, this plant employs the most modern, commercial-size equipment and has a capacity up to five-tons per hour. Thus, continuous testing of large samples can be done under conditions duplicating full-scale operation. While installed primarily to serve the needs of potential users of the Heavy-Media Separation Processes offered by Cyanamid, the plant also increases the scope of our testing facilities on Flotation and gravity separation.

Heavy-Media Separation is now being used to treat large tonnages of Lead-Zinc, Zinc, Tin, Garnet, Cuyuna and Mesabi Iron ores. Test results show its applicability to Magnesite, Fluorspar, Copper, Tungsten, Topaz, Manganese, Sidertic and brown iron ores. Several plants are being designed and constructed.

Using both ferrous and non-ferrous media, Heavy-Media Separation Processes offered by Cyanamid have great scope and flexibility of operation. The increased testing facilities will undoubtedly point the way to even greater economic use of this proven low-cost method for pre-concentrating sub-ores or waste products hitherto considered too low-grade for treatment or for pre-concentrating present mill feed to produce larger metal output from existing equipment; for producing directly a marketable concentrate; or for effecting savings in mining costs.

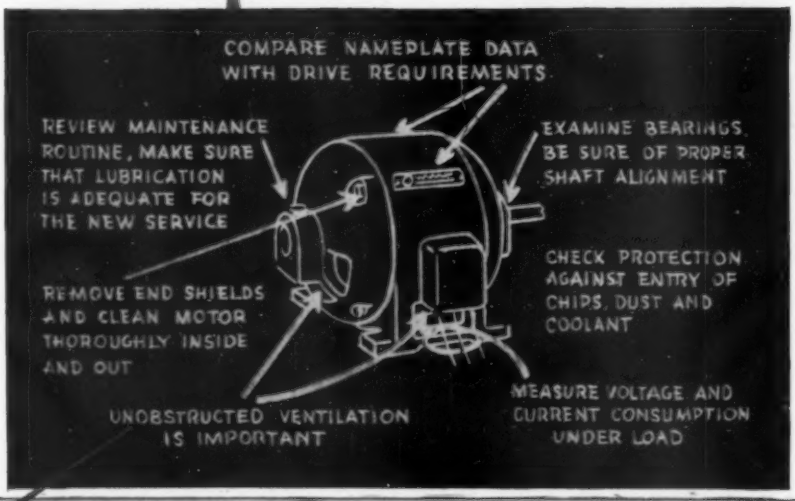
Expansion of the Cyanamid Ore Dressing Laboratory at this time is in keeping with Cyanamid's long-time policy of providing the mining industry with unexcelled facilities for Chemical, Physical and Microscopical research and testing, as well as facilities for batch and continuous testing to determine the most efficient flow scheme.





30 Rockefeller Plaza, New York, N. Y.

IT'S TIME TO BE A CRANK ABOUT MOTOR CARE


COMPARE NAMEPLATE DATA WITH DRIVE REQUIREMENTS
REVIEW MAINTENANCE ROUTINE, MAKE SURE THAT LUBRICATION IS ADEQUATE FOR THE NEW SERVICE
EXAMINE BEARINGS, BE SURE OF PROPER SHAFT ALIGNMENT
CHECK PROTECTION AGAINST ENTRY OF CHIPS, DUST AND COOLANT
REMOVE END SHIELDS AND CLEAN MOTOR THOROUGHLY INSIDE AND OUT
UNOBSTRUCTED VENTILATION IS IMPORTANT
MEASURE VOLTAGE AND CURRENT CONSUMPTION UNDER LOAD

protect your production with this maintenance plan

Planned motor maintenance, keyed to today's loads and conditions, saves vital hours by forestalling future breakdowns and delay. In replacing hit-or-miss motor service with a regular schedule of trouble-*prevention*, you'll find real help in the new G-E publication, "How to Care for Motors."

The check list (right) tells what to do. This book tells how to do it, using well-proved methods that save time and help assure long-lasting motor service.

And, of course, your local G-E Motor Representative is always ready to aid you in putting these suggestions into practice, or in getting the new motors you may need for essential wartime projects.

1. Make sure that motors are selected to *match the job.* Install motors so they are properly aligned with the driven load and are easily accessible for regular inspection.

See "How to Care for Motors"

2. Keep motors free from dust and dirt. Establish a definite cleaning schedule.

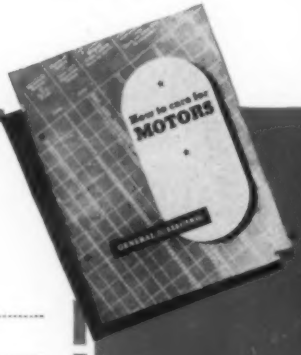
See "How to Care for Motors"

3. Be sure that lubrication is frequent enough to take care of increased production. See that employees are instructed as to proper methods.

See "How to Care for Motors"

4. A general overhauling of hard-worked motors will add years to their life. If your motors haven't had an overhaul in the last year, try to arrange your schedule to permit one.

See "How to Care for Motors"



General Electric, Sec. RP 750-179C
Schenectady, N. Y.

Yes, send me a copy of "How to Care for Motors," GEA-2856A.

Name.....

Title.....

Company.....

Address.....

City.....State.....

2080

HOW TO CARE FOR MOTORS

Every supervisor and maintenance man will find this book of value . . . It tells what to do to get the most out of motors, old or new. If you're setting up a maintenance program to keep up with today's unprecedented demands, or if you're "switching" motors from one job to another, or equipping machines with new motors, you'll find this booklet of helpful motor facts will save you time. Write for a copy.

BUILDER OF TRI CLAD MOTORS

GENERAL ELECTRIC

World's Smallest Explosive Charge

HERE'S a rivet that's making history. It's the Explosive Rivet—a new development by du Pont.

To you who shoot dynamite by the stick, case, or ton, the Explosive Rivet is of more than passing interest. It's a dramatic example of the control achieved by du Pont over the action of explosives. For this rivet is a precision product in which uniformity of results must meet the high standards required for America's finest military aircraft.

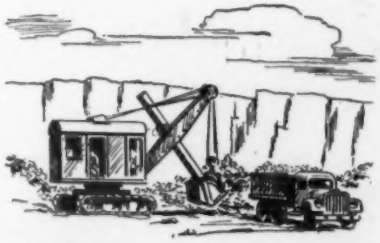
In the rivet shank there's a tiny explosives charge. It's the smallest "load" used in industry, yet the job it does in millions of Explosive Rivets speeds aircraft production.

SAVE FATS FOR EXPLOSIVES

Fats are urgently needed for making glycerin—an essential ingredient in the production of high explosives. Urge housewives to aid the war effort by taking waste fats to their butcher.

Explosive Rivets speed up "blind" riveting—that is, riveting in places where you can't reach one side of the rivet to back it up. To "drive" or set these rivets you simply apply the tip of an electrically-heated iron to the rivet head. In 2 seconds, or less, the heat fires the charge, forming a perfect, barrel-shaped head on the blind end.

At du Pont the same men, the same fund of experience, and the same laboratory facilities responsible for perfecting and manufacturing Explosive Rivets are constantly at work producing new and better commercial explosives and blasting supplies. Thus, whether your job is to bring down big, shatter-proof lump coal—to drive a tunnel through hard rock—or to quarry stone, you can count on Du Pont Explosives Research for the finest in explosives. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington, Del.



DEPENDABLE DU PONT PRODUCTS FOR QUARRY BLASTING

"NITRAMON"* — the safest thing you can use for quarry blasting.

"RED CROSS EXTRAS"* — with their new water resistance, among the best all-around explosives available.

ELECTRIC BLASTING CAPS — reliability proved by over one billion sold to date.

*Trade mark

DU PONT

REG. U. S. PAT. OFF.

EXPLOSIVES

415,000 TONS of ROCK for VICTORY

LESS THAN SEVEN MONTHS OUTPUT for the KASER CONSTRUCTION CO. ADEL • IOWA

Output like this means something to you for the future! 415,000 tons of stabilized base, concrete aggregate and sub-base materials (all for vital defense projects) is a real indication of what Cedarapids plants are doing under pressure.

This is the output of *one* Cedarapids plant owned by the Kaser Construction Company of Adel, Iowa, on their Lecompton, Kan., Eudora, Kan., and Pawnee, Okla., jobs which cover a period of less than seven months time.

Output like this can only be accomplished with trouble-free service day after day—the kind of service that you are going to require after the "Duration".

It doesn't matter what your aggregate reduction and producing problem is—whether it is small or large—Cedarapids plants can be engineered for any combination of final size or production. *Iowa can meet your future plans* whether it is for crushers, screens, bins, asphalt plants, driers, or portable or stationary plant equipment. Now is the time to familiarize yourself with Cedarapids equipment. Come to headquarters for aggregate producing equipment.

IOWA MANUFACTURING CO.
Cedar Rapids • Iowa

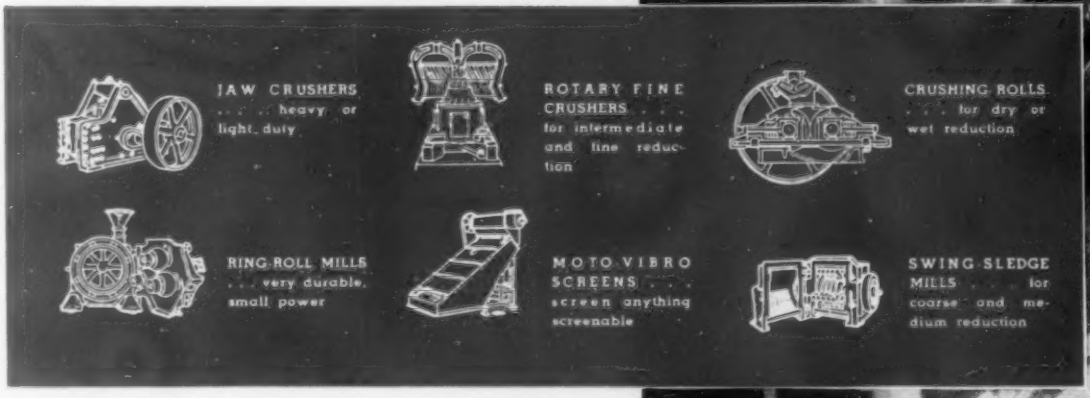
Production for Victory

Working!

Along the far-flung battle line of America's wartime production, *Sturtevant Air Separators* are doing a real job—stepping up production.

In Cement Alone, 317 *Sturtevant Air Separators* Have Been Installed "On Approval"—*Not One Rejected.*

Here are some of the reasons for this remarkable record: (1) Range of fineness from 40 to 350 mesh. (2) capacities of ¼ ton to 50 t.p.h., while increasing mill capacity as much as 300%. (3) controlled specific surface area. (4) lowered mill and product temperatures.


JAW CRUSHERS . . . heavy or light duty
ROTARY FINE CRUSHERS . . . for intermediate and fine reduction
CRUSHING ROLLS . . . for dry or wet reduction
RING-ROLL MILLS . . . very durable, small power
MOTO-VIBRO SCREENS . . . screen anything screenable
SWING-SLEDGE MILLS . . . for coarse and medium reduction

Write for latest bulletin and engineering information now!

STURTEVANT

MILL COMPANY

Harrison Square Boston, Mass.

415,000 TONS of ROCK for VICTORY

LESS THAN SEVEN MONTHS OUTPUT for the KASER CONSTRUCTION CO. ADEL • IOWA

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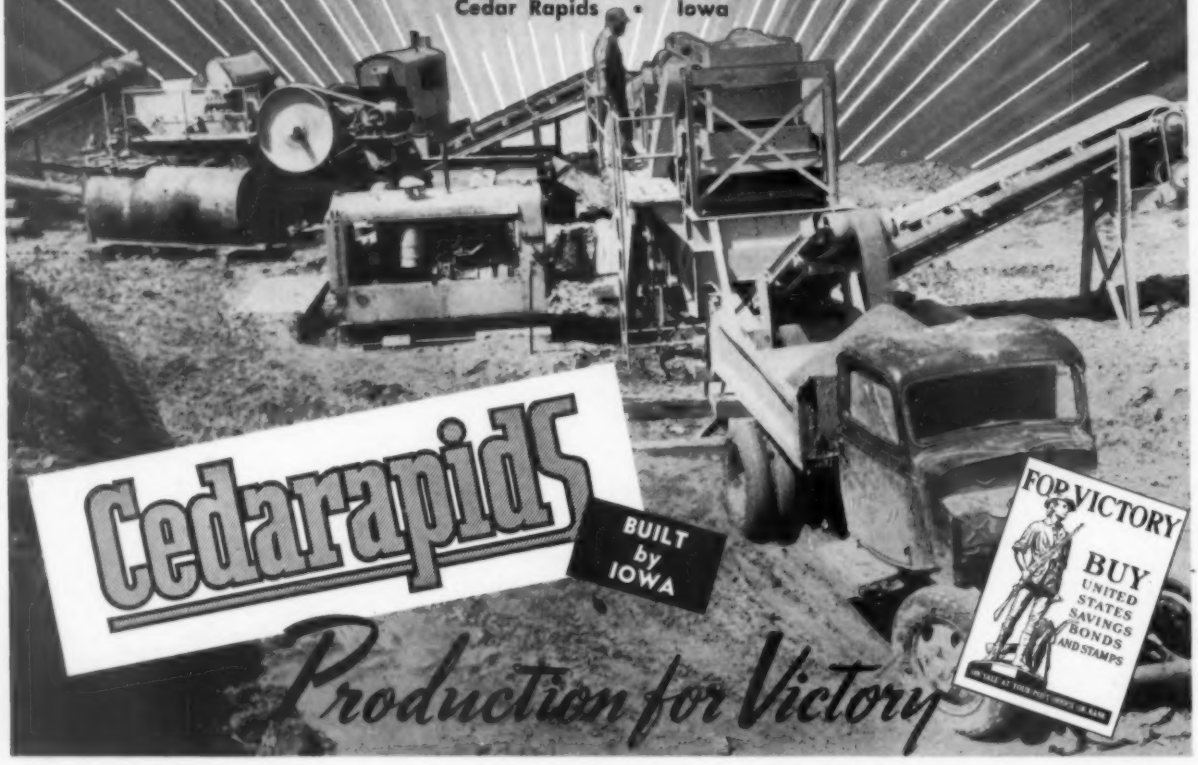
IOWA MANUFACTURING CO.
Cedar Rapids • Iowa



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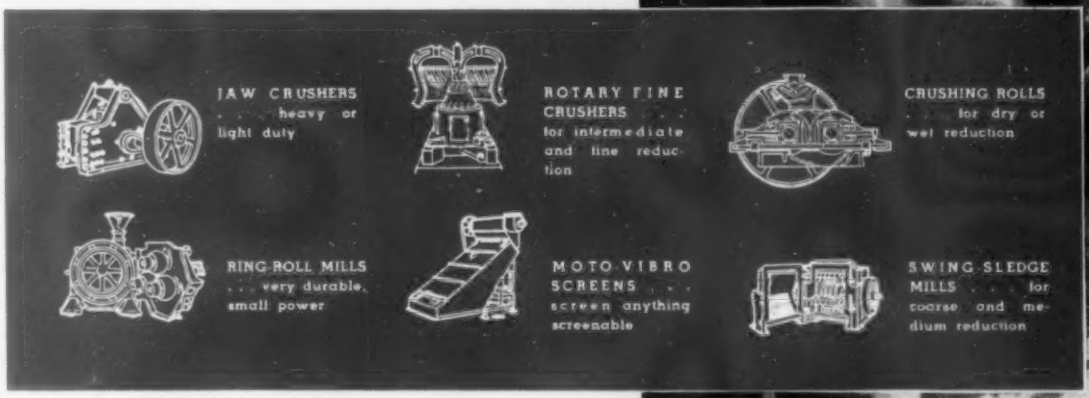
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ROTARY FINE CRUSHERS . . . for intermediate and fine reduction
CRUSHING ROLLS . . . for dry or wet reduction
RING-ROLL MILLS . . . very durable, small power
MOTO-VIBRO SCREENS . . . screen anything screenable
SWING-SLEDGE MILLS . . . for coarse and medium reduction

Write for latest bulletin and engineering information now!

STURTEVANT

MILL COMPANY

Harrison Square Boston, Mass.

TRY THIS!

and prove to yourself that BEMIS MULTIWALL PAPER BAGS can take rough handling

FILL a Bemis Multiwall Paper Bag with cement. Throw it on a truck—stack other bags on it—give it "the works!" (Better get a big husky truck driver to do it for you because you'll get pretty tired before the bag breaks.)

This experiment will prove to you that Bemis Multiwall Paper Bags for cement can take rough handling in the shipping room . . . in transit . . . on the job.

This extra toughness saves lost time on the production line, too, because it reduces breakage to a minimum.

And, remember, toughness is only *one* quality of Bemis Multiwalls. They are showerproof. They are economical. And the clean-cut printing of your brand makes them effective salesmen.

We suggest you try this experiment before you place another bag order. We'd like to have you know about Bemis Multiwall Paper Bag quality. Sample bags for the trial will be sent upon request . . . free and without obligation.

BEMIS BRO. BAG CO.

East Pepperell, Mass. • Peoria, Illinois • San Francisco, Calif.
Wilmington, Calif. • St. Helens, Oregon

OFFICES: Baltimore • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles • Louisville • Memphis • Minneapolis • New Orleans • New York City • Norfolk • Oklahoma City • Omaha • St. Louis • Salina • Salt Lake City • Seattle • Wichita

Heavy-Duty Allis-Chalmers Power Units Give You Every Advantage...Have Countless Applications

● Designed for tough tractor service, high in torque, Allis-Chalmers heavy-duty Power Units provide sturdy, substantial power for a variety of jobs. Operate smoothly on steady or intermittent loads — easily drive roll and jaw crushers, conveyors, pumps, screens, hoists, shovels, draglines, air compressors, provide power for operating repair shops, numerous other uses. Hundreds of thousands are turning out smooth, economical power on scores of applications. You get more horsepower per dollar invested — lower priced than any other engines of comparable displacement and horsepower. Fit every type of job — neat and compact in design, self-contained and protected from the elements, available with various accessories! Parts and replacements obtainable everywhere! Backed by nearly 100 years industrial power equipment manufacturing experience! A variety of sizes for every power requirement. Choice of fuels. Get all the facts . . . NOW! Write for literature.

Shift after shift, smooth operating, dependable Model L-90's keep crushers producing steadily for Knudsen-Burns, Denver, Col., (above) and Gingell Quarry, Fairfield, Pa., (below).

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE, U. S. A.

Power Units

5 SIZES...15 to 110 B. H. P.

● Gasoline ● Low Grade Fuel ● Natural Gas ● Butane

GIANT-

160 Foot Dorr Hydroseparator In Earthen Tank For Phosphate Washing Plant

THE 160 foot Dorr Hydroseparator shown above is the largest ever to be installed in an earthen tank. It will handle 35,000 gallons per minute of water and 650 long tons per hour of feed—producing 450 long tons per hour of recoverable phosphate sands.

Dorr Torq Hydroseparators and Thickeners are inherently correct for use in dollar-saving earthen tanks. The exclusive "torq" feature—automatically self-raising and lowering arms—reduces to a minimum the danger of stalling or breakage. Installations like this 160 foot Hydroseparator have proven the practicability of Dorr Torq mechanisms used in earthen tanks—proven too, the substantial savings possible with this type of construction.

A Dorr Torq mechanism will give you topnotch operating results—an earthen tank can probably save you money. Combined, they provide the simplest and most economical settling capacity possible. Why not check our nearest office for further information?

DORRCO

THE DORR COMPANY, INC., ENGINEERS

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ATLANTA, GA. . . . CANDLER BUILDING
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ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE

Everywhere MARIONS Are Setting The Stage for Victory!

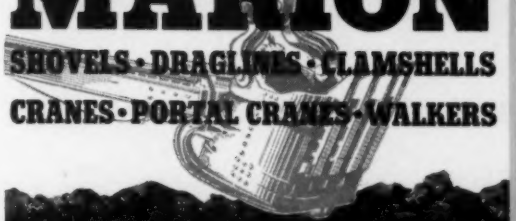
In open pit mines, digging raw materials for fighting tools . . . in quarries, gravel pits and on sand piles . . . on vast Army, Navy and Maritime construction projects . . . in shipbuilding yards . . . along cargo loading docks, MARIONS of every description are at work putting new confidence into the United Nations with every swing of the boom . . . bringing defeat ever closer to the enemy with every load it delivers. Yes, the powerful influence MARION machines are wielding in this war is helping to write a brilliant chapter of production and material handling accomplishments that will be recognized in history as one of the forerunners to Victory.

THE MARION STEAM SHOVEL CO., Marion, O., U. S. A.

MARION

SHOVELS • DRAGLINES • CLAMSHELLS

CRANES • PORTAL CRANES • WALKERS



WORKING FOR VICTORY: DIGGING — Coal • Magnesium Iron Ore • Copper Ore • Bauxite • Manganese • Nickel Molybdenum • Sand & Gravel • Clay

MATERIAL HANDLING — Shipbuilding and Cargo Loading

BUILDING — Airports, Ordnance Plants, Arsenals, Army Camps, Marine Bases, etc.

STRETCHING the footage of blast hole bits

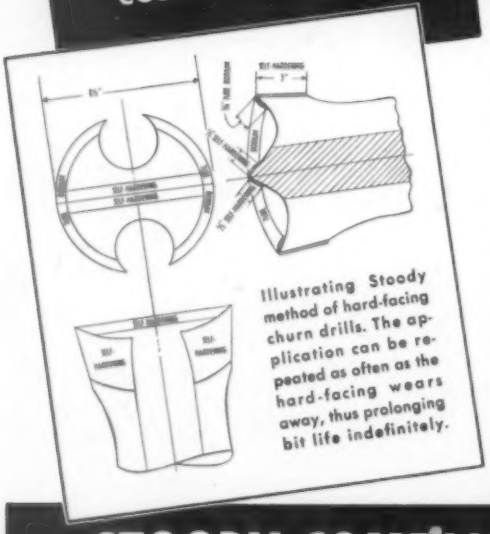
STOODY PROCESS ADDS 30 PER CENT TO DRILLING SPEED

•

PRODUCES 8 TIMES MORE FOOTAGE

•

ELIMINATES COSTLY BIT CHANGES



Illustrating Stoody method of hard-facing churn drills. The application can be repeated as often as the hard-facing wears away, thus prolonging bit life indefinitely.

Here is a Typical Example of *Hard Facing Efficiency*

An Oklahoma Contractor operating in very hard limestone averaged only 24" of hole per bit before churn drills dulled. The bits then had to be removed for resharpening with a time loss of approximately 25 minutes per trip.

Today this contractor hard-faces churn drills with Stoody Tube Borium and Stoody Self-Hardening with the result that bits now drill 16 feet before dulling — an increase of 800 per cent!

Cost of the hard-facing, as illustrated, is extremely low requiring approximately 3 ounces of Tube Borium and 2 pounds of Stoody Self-Hardening.

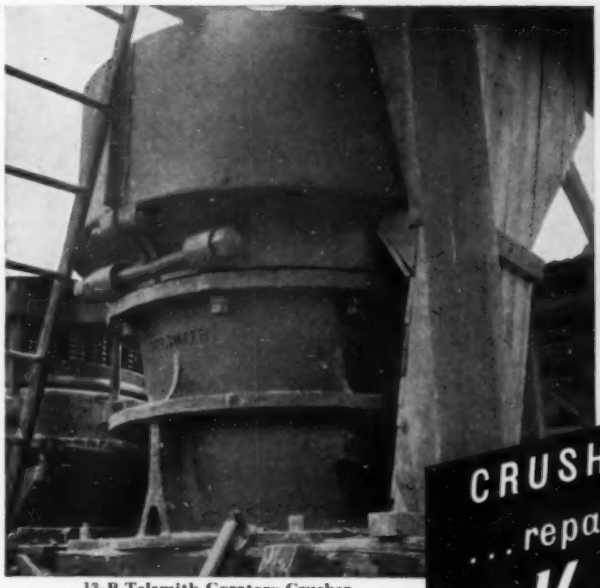
Thirty minutes welding time, gas costs and hard-facing rods total not more than $2.75 per 6" bit. Yet the savings in down time alone equal 3½ hours of valuable drilling time!

Furthermore hard-faced churn drills dig 30 per cent faster than forge sharpened bits because they *cut* the formation instead of breaking it up by impact.

Stoody's new booklet "How to Get 8 Times More Footage from Churn Drills" describes the hard-facing application more fully. To obtain your copy fill in and return the coupon.

STOODY COMPANY, 1129 W. SLAUSON, WHITTIER, CALIF.

STOODY COMPANY *Hard Facing Alloys*



13-B Telsmith Gyratory Crusher

CRUSHING 190,595 TONS

...repair parts and labor cost

1/10¢ per Ton

WITH THIS

TELSMITH

CRUSHER

RALPH E. MILLS, of Roanoke, Va., who heads the general highways contracting firm bearing his name, owns the completely modern Telsmith-equipped Arlington Stone Co. plant at Leesburg, Va. He not only knows highway construction and materials, but the kind of quarry plant equipment best suited to turn out crushed stone for highway construction.

● **Has Mr. Ralph E. Mills' choice of Telsmith equipment for his own quarry plant been justified by results? Let's look at the record of the 13-B Telsmith Gyratory Crusher. Used as an intermediate crusher for plus 2½", it takes the feed from the primary at 80 to 90 tons per hr.**

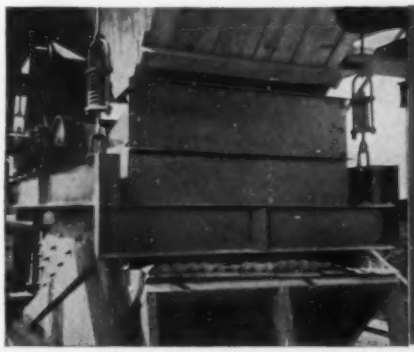
During the first sixteen months of the plant's operation, this Telsmith Gyratory Crusher worked 3,941 hours, and crushed 190,595 tons. Repair parts cost $126.77. Labor charged to crusher maintenance: $55.73. Total crusher upkeep for 16 months: $182.50—*less than 1/10¢ per ton!* And the stone crushed is particularly hard and abrasive.

"Cost of lubricating oil is not included," says Mr. Mason M. Schoolfield, Plant Supt. "The figures do include all manganese costs—because there haven't been any. It is still operating with the original concaves and mantles. We bought two sets of concaves, one standard, the other extra thick to make smaller stone . . . the extra thick set has operated about four-fifths of the time. Both sets are still in good condition. The largest single item in the above cost figures was not crusher parts at all, but a new set of V-belts. In view of the type stone we are handling here, I think the figures are very remarkable!" You can get results like this in your plant—with Telsmith equipment! Get Bulletin Q-11.

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London Q-7

Room 1604—50 East 42nd St. New York City	211 W. Wacker Drive Chicago, Ill.	713 Commercial Trust Bldg. Philadelphia, Pa.	19-21 Charles St. Cambridge, Mass.	G. F. Seeley & Co. Toronto, Ont.	Mines Eng. & Equip. Co. San Francisco—Los Angeles
Brandeis M. & S. Co. Louisville, Ky.	Charleston Tractor & Eqpt. Corp. Charleston, W. Va.	Roanoke Trac. & Eqpt. Co. Roanoke, Va.	Clift L. Preister 911 S. 3rd St., Memphis, Tenn.		Wilson-Weesner-Wilkinson Co. Knoxville and Nashville, Tenn.



Minus 2½" material passing grizzly, and discharged from 13-B Telsmith Gyratory Crusher, drops onto 28" x 35' Telsmith Belt Conveyor, is carried to Telsmith No. 7 Belt Elevator with 43" centers and goes up to two 4' x 10' Telsmith Pulsator Screens (*left*) over storage bins. Any one of the five finished products can be re-conveyed from bins to the Telsmith No. 36 Gyrasphere Crusher (*right*, with Telsmith Gyratory on extreme right) for re-crushing into ⅜", ½" or ¾" chips.

Even CP Compressors

MUST BE LUBRICATED

CP Portable Compressors are equipped with a force feed system of lubrication which is automatic, positive, economical – and which also keeps the air relatively oil-free. Nevertheless, for the dependable, uninterrupted service so essential under war conditions, there are a few manual operations which should be performed regularly. Four of these are illustrated below; others will be presented in future advertisements.

HOW TO GET MAXIMUM SERVICE FROM YOUR CP PORTABLE COMPRESSORS

1 Remove air intake filter, clean with kerosene weekly. Dry all parts before replacing. Fill oil to bead indicated on outer casing.

2 Lubricate the fan bearings with a grease gun every three hundred operating hours. Use a semi-fluid grease of good grade.

3 Keep crank case filled to indicated level. Drain every 100 operating hours. Refill with grade of oil specified in instruction book.

4 Get the habit of checking compressor and engine oil pressure gauges frequently on each shift. Pressure should be about 25 lbs.

★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
(Hicycle...Universal)
ROCK DRILLS

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York, N. Y.

★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

SHOW 'EM YOU ARE CONSERVING

Hundreds of operators on shovels, bulldozers, tractors, scrapers and trucks are proudly displaying this red, white and blue 5" diameter emblem. It means they are conserving their particular construction equipment, making it last longer. Won't you join their ranks? A postcard with your name and address will bring you one or more free emblems.

★ ★ ★

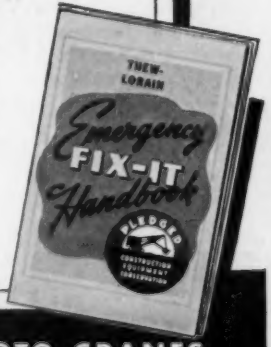
If you can't get new equipment, you'll have to take care of what you have

IT'S your problem and ours too! And it's got to be licked. Equipment must last longer—emergency repairs must be made quickly, with a minimum use of critical, hard-to-get materials.

This new Thew Emergency Fix-It Handbook will help many Lorain owners answer the problem. It's a handy repairman's guide, covering all Lorain Models. It describes practical methods for making emergency repairs and how to salvage worn or used parts.

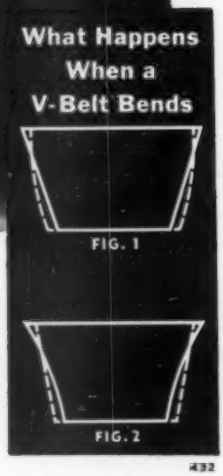
Your copy will be mailed the day we receive your request. Write for the Fix-It Handbook now!

THE THEW SHOVEL COMPANY
LORAIN, OHIO



THEW-LORAIN

CRANES • MOTO-CRANES
SHOVELS • DRAGLINES



This Simple Test Shows the *Importance* of the CONCAVE SIDE!

432

You can see for yourself why belts built with the Concave side should be used in *your* plant if you will just pick up any straight-sided V-Belt and bend it as it bends in going around its pulley. As the belt bends, grip its sides as shown in the large photograph above. You will feel those sides *change shape*. The top of the belt, being under tension, narrows. The bottom, under compression, widens. The sides bulge out—as shown in Figure 1 (above, right).

Now bend a V-Belt that is built with the patented Concave side. The same shape-change takes place—but it merely *straightens* the precisely engineered Concave side, as shown in Figure 2. This belt, when bent, exactly fits its sheave groove. Two savings result. FIRST:—there is no out-bulge—therefore the entire side of the belt wears evenly and this means *longer life*. SECOND:—The entire side of the belt uniformly grips the sheave-groove wall. This carries heavier loads without slippage—a saving in belts for you, a saving in rubber for the nation.

Only belts built by Gates are built with the Concave side, a Gates patent.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

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DENVER, COLO. 999 South Broadway
DALLAS, TEXAS 2213 Griffin Street
PORTLAND, ORE. 333 N. W. 5th Avenue
SAN FRANCISCO, CAL. 1090 Bryant Street

PMCO WELDED DIPPERS

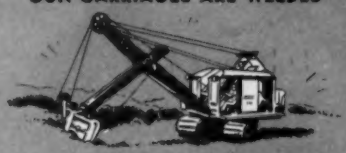
★ Built like a battleship—reinforced with welded sections to withstand the bombardment of heavy impacts in rough digging. Unhampered by excess weight existent in a solid casting due to foundry limitations.

WELDED PRODUCTS LEAD AMERICA TO VICTORY

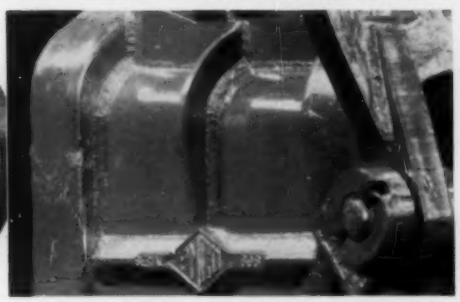
WAR SHIPS ARE WELDED

TANKS ARE WELDED

GUN CARRIAGES ARE WELDED



POWER SHOVELS ARE WELDED



The complete unit of reinforced welded sections is fully stress relieved after welding.

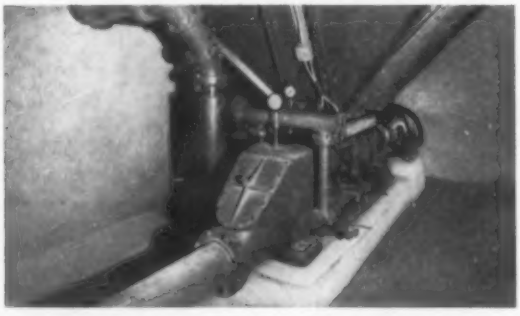
We operate the largest and most complete manganese steel foundry in the United States.

PETTIBONE MULLIKEN CORPORATION

Established 1880

4710 West Division Street, Chicago, Illinois

Hopper-bottom, bulk-cement car over pit and Fuller-Kinyon Pump.



Fuller-Kinyon Stationary Pump in pit underneath hopper-bottom car.

Fuller Rotary Single-stage Compressor which supplies air to Fuller-Kinyon Pump.

FULLER-KINYON SYSTEM

UNLOADS HOPPER-BOTTOM CARS
AND CONVEYS TO BARGES

• • •

FULLER ROTARY COMPRESSOR

FURNISHES AIR FOR THIS CONVEYING SYSTEM

This efficient method of unloading and transferring bulk Portland cement from cars to barges is employed by a railroad company on the Hudson River, New York City.

Cement is received in hopper-bottom cars and discharged by gravity to a Fuller-Kinyon Stationary Pump located in a pit directly underneath the car. Cement is conveyed by the pump through a short pipe line to the edge of the dock. For ease of manipulation in loading barges, a flexible rubber hose is coupled to the end of the pipe line, this hose being swung in any direction for attaching to connections entering the hatches of the barge. Loading rate, 400 barrels per hour. A Fuller Rotary Single-stage Compressor furnishes air for this conveying system . . . air when and where needed, and at pressures to do the work most economically.

Fuller-Kinyon Systems have many applications. You too, may have a loading, unloading or transporting problem that can be solved with this system.

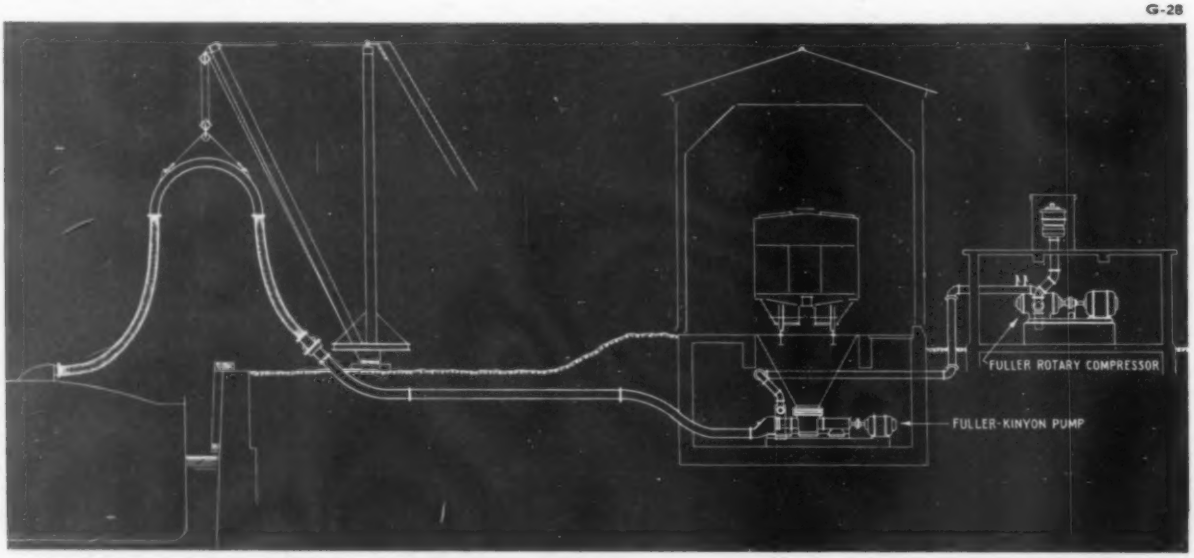
FULLER COMPANY

CATASAUQUA, PENNSYLVANIA

Chicago: 1144 Marquette Bldg.

San Francisco: 421 Chancery Bldg.

G-28



with RAYMOND Bowl Mill Firing

The diversion of fuel oil and natural gas to war production needs is an "alert signal" to plant operators that it is time to *change to coal*.

In converting your plant to operate with pulverized coal, you can install the modern Raymond Bowl Mill with assurance of greater economies than ever before . . . as based on its proved record of efficiency in more than 500 installations.

It is today's standard direct-firing unit for rotary kilns, burning lime, dolomite, cement or magnesite. Capable of running months at a time without shutdowns. Low operating and maintenance costs. Its savings often amortize the investment in less than two years.

The Raymond Bowl Mill handles any grade or moisture coal, maintains uniform grind at all times, dries and pulverizes simultaneously. Adjustments and lubrication made from outside while mill is running.

It provides easy and close control with dustless and noiseless operation.

The arrangement shown above is a typical application of the Raymond Bowl Mill in firing a Rotary Kiln.

Ask for Bowl Mill CATALOG No. 43

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1307 North Branch Street CHICAGO
Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

MAKING HEAVY BOMBERS LIGHT

Buell Dust Recovery Systems play an important part

The lighter the bomber itself, the bigger its bomb load. So America's air might is muscled with modern metals—aluminum, magnesium, beryllium, molybdenum and others—that are miracles of both strength and lightness. In the bombers above, for instance, motor weight per horse power is barely over a pound—down from 12.7 lbs. per h.p. at Kitty Hawk.

Buell Dust Recovery Systems play an important part in the process of transmuting ore into these vital metals. Installed in conjunction with pulverizers, kilns, roasters and sintering furnaces, Buell cyclones recover for re-use virtually 100% of the critical material that would otherwise escape in the flue gases —a saving that mounts up to thousands of tons annually.

The high efficiency of Buell Dust Recovery Systems is due to the van Tongeren cyclone—an ingenious design feature found only in Buell equipment. Long life, low operating cost, negligible maintenance and unlimited capacity are other important advantages that have made Buell Dust Recovery Systems first choice with so many great industrial concerns.

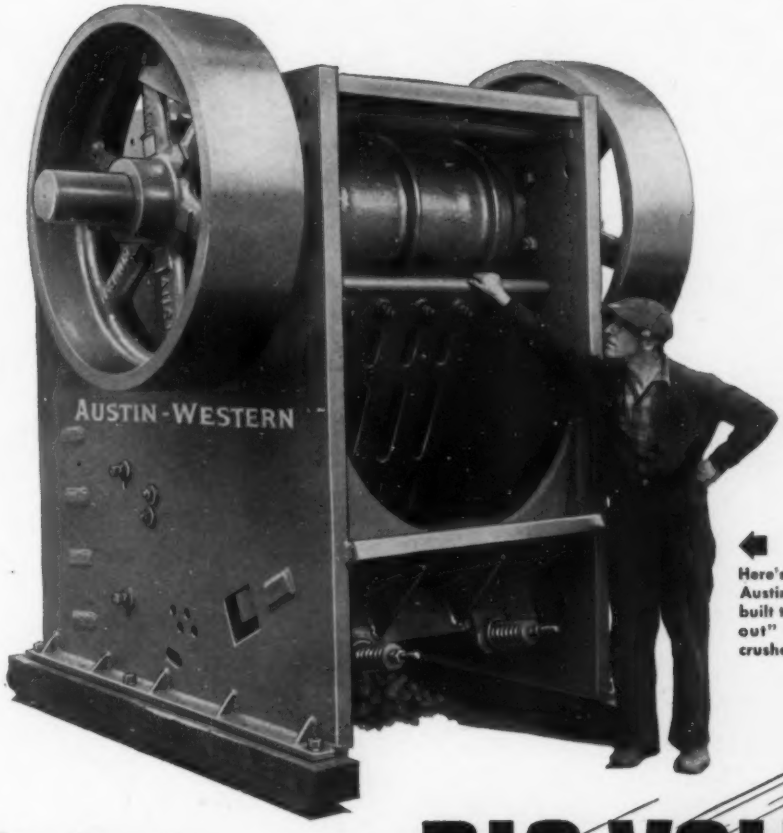
Factual 28-page book.
Write for Bulletin G-842.

Memo to:
ROCK PRODUCTS INDUSTRY
Buell Dust Recovery Systems offer outstanding advantages in efficient economical operations in conjunction with
Pulverizers
Kilns
Stone Dryers
Finishing
Bagging
and other operations.
Buell installations are in wide use throughout the rock products industry. On the list of Buell users are such well-known names as Dewey, Kosmos, Lehigh, Lone Star, Medusa, Standard Lime & Stone...and many others.

buell
DUST RECOVERY SYSTEMS

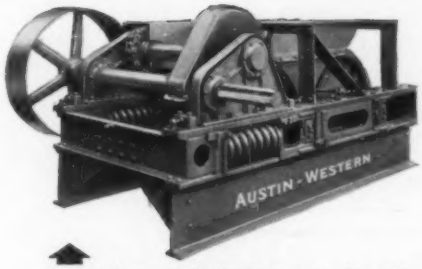
BUELL ENGINEERING COMPANY, INC.
2 Cedar Street, Suite 5000, New York
Sales Representatives in Principal Cities

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST



Here's a jaw crusher (the Austin-Western 2540) that's built to take it and to "dish out" a big volume of crushed stone.

Quick Delivery in BIG VOLUME at Rock Bottom Tonnage Rates



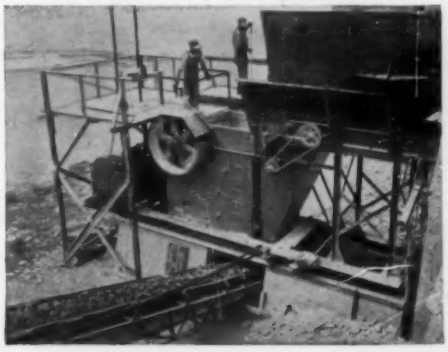
Austin-Western Roll Crushers are unbeatable for fine reduction crushing. Chain driven rolls make possible a wide variation in product size and assure long service.

COSTS PER TON TAKE A NOSE DIVE when this big job starts up. It's been carefully engineered to operate smoothly and *economically,* at higher speed—and is of the force feed, overhead eccentric type; a type which has proven itself best for rugged, general service.

Frame, of heavy, welded steel plate, provides an unbreakable assembly. Shaft is extra large and jaws extra deep. The bearings used are oversize and self-aligning—the finest built and the most economical to operate.

Austin-Western builds a range of crusher sizes to meet various capacity requirements. Also roll crushers, like that illustrated, and a line of portable plants and accessory equipment to serve every pit and quarry need. For the duration, our output is earmarked for essential war use. If we may serve you on such work, our engineers will be glad to cooperate. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois, U.S.A. Distributors in Principal Cities. Cable Address: AWCO, Aurora.

The 2540 installed on the job and working—notice the product going up the conveyor.



BUILDERS OF ROAD MACHINERY

Austin Western

SINCE 1859

"Specify CONTINENTAL"

MATERIALS HANDLING and POWER TRANSMISSION Equipment

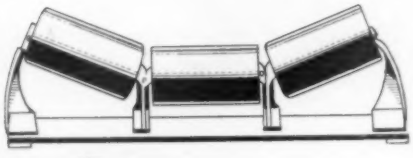
BIRMINGHAM, ALABAMA

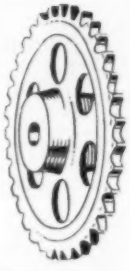
DALLAS, TEXAS

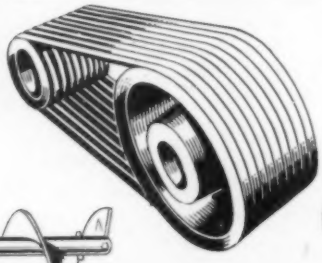
PRATTVILLE, ALABAMA

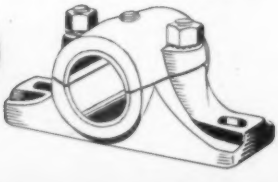
SPECIFY CONTINENTAL! This is assurance to engineers and operating men throughout the Sand, Gravel and Stone industry that they get Materials Handling and Power Transmission Equipment of the highest quality, properly designed and delivered on schedule. Proof of this assurance is attested to by repeat orders received from our many customers in this field. And it can be your assurance, too. We will welcome the opportunity to supply any of your requirements and solicit your inquiries. The next time you have a Conveying or Power Transmission problem — SPECIFY CONTINENTAL.

Our Catalogue No. 40 gives complete information on our line of Materials Handling and Power Transmission Equipment. Write for a copy today!









Industrial Division

CONTINENTAL GIN COMPANY

CGC ATLANTA • BIRMINGHAM • DALLAS • MEMPHIS

Down to river's edge from the northwest, land of the tall timber, come giant Mack trucks bearing thirty-ton loads of logs . . . cut from centuries-old trees for the war needs of today.

TIME DOES TELL . . . PLENTY!

The Mack trucks you see on the road today are of all capacities. But there's one thing they have in common. *Being Macks, they're built to last!* That's a basic Mack advantage, doubly important in wartime when replacements are hard to get. Seven of every ten Macks built ten years ago are still on the job. For forty-three years Mack trucks have established a record for long life that is still gaining on home front and battle front alike. The expression "Built like a Mack truck" was not coined by us, but by those who watch Mack trucks at work.

Mack Trucks, Inc., Long Island City, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.

Mack

TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY . . . IF YOU PLAN TO GET ONE, YOU'RE WISE!

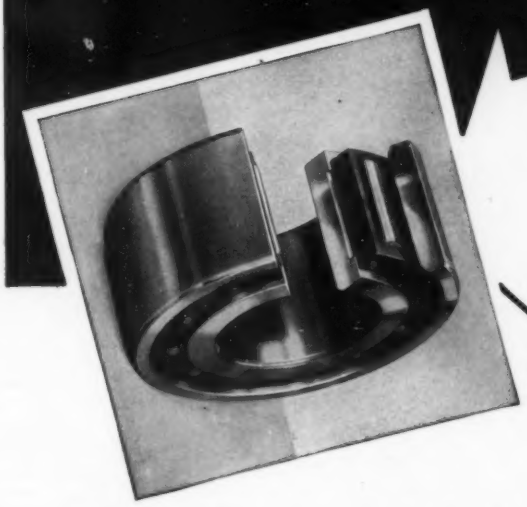
More Finely Crushed Materials for Wartime Construction

NORDBERG MFG. CO.
MILWAUKEE WISCONSIN
NEW YORK · LOS ANGELES · LONDON · TORONTO

The Symons Cone Crusher with its enormous capacity of finely crushed product has been of outstanding service in the wartime construction program. Where the demand has been for minus half inch materials as required for flying fields, air and naval bases, docks, cantonments, etc., the Short Head Cone has provided these in greater tonnage and more quickly than is possible with any other type of equipment. Wherever reduction crushing is done in quantity, you will find Symons Standard and Short Head Cones on the job, producing the finer sizes in greater output and at lower cost.

SYMONS CONE CRUSHERS

Longer Life for Every Bearing *Because:*



All ROLLWAY RADIAL BEARINGS are Free from Thrust Loads

All ROLLWAY THRUST BEARINGS are Free from Radial Loads

PILE a thrust load on a roller bearing that's already carrying a radial load and you introduce complex stresses that tend to force the rollers from the race . . . that tend to increase sliding friction and wear-back between the roller ends and the radius of the race . . . and that tend to cause earlier fatigue failure.

That's why Rollway Solid-Cylindrical Roller Bearings split every load into its two simplest components of *pure* radial and *pure* thrust . . . carrying each of these on separate roller assemblies at RIGHT ANGLES TO THE ROLLER AXIS. Both torque per bearing and load per roller are substantially reduced. You get greater roller cross-section and greater roller contact area per unit of load, hence more strength to meet stress, and less hazard of spalling and brinelling the race.

You can usually change over from other bearings to Rollways of higher load capacities without increasing boundary dimensions. But, for maximum life and service, your bearings should be carefully chosen as to size and type. Send us your drawings, or a description of your application, for free and confidential bearing recommendation.

For longer bearing life, more efficient performance and more economical maintenance . . .

FOLLOW THIS BASIC BEARING PRINCIPLE

- All radial loads carried at right angles to the roller axis.
- All thrust loads carried at right angles to the roller axis.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, N. Y.

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

We have <u>two</u> reasons to be proud of this Flag

First, of course, we are proud of the Army-Navy "E" flag because it is an award to the 3,000 employees of our Richmond refinery. We have long known that their energy, devotion and skill merit the highest praise.

The other reason is that this flag is a harbinger of better days to come, when we will take pride in offering to industry the fruits of Richmond's tremendous war effort.

Today we can only hint at the giant strides our petroleum research and production have made. We cannot publish the specifications of a host of new products, nor the story of how old products have been sensationally improved. We cannot describe the system by which these products are distributed on a world-wide scale.

But we can promise you that, when these facts become known, they will open new horizons for American businessmen and technicians in many fields. They will prove once again that "know-how" can turn yesterday's impossibilities into tomorrow's accomplishments.

In the meantime, the Richmond refinery and all of Standard of California are living up to the "E" flag, helping bring the inevitable victory nearer.

STANDARD OIL COMPANY OF CALIFORNIA

RPM DELO IS USED IN U. S. NAVY DIESELS First used in submarines, RPM DELO performed so well that it is now also used to lubricate high-speed Diesels in the Navy's mine sweepers, sub chasers, landing barges, patrol boats and ocean-going tugs. In all these vessels it is licking some of the toughest lubricating problems in the world. RPM DELO is typical of Standard's development of petroleum products for war.

RPM DELO

RPM DELO is marketed under the following names:

RPM DELO • Caltex RPM DELO • Kyso RPM DELO
Signal RPM DELO • Imperial-RPM DELO • Sohio RPM DELO
CONCENTRATE

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity

ROEBLING "Blue Center" helps them set the pace!

They start with a cow pasture and in a few hours have it ready for fighter planes taking off to battle . . . with the aid of "swiss cheese" steel strips woven into an all-weather emergency landing field! That's the kind of problem the Corps of Engineers thrive on.

We know, because "Blue Center" goes along on so many of their assignments . . . from tractor cranes to mobile cableways, from river dredges to motorized winches. And whether it's lifting the face of Mother Earth for the Army or passing the ammunition for war plants, you'll find Roebling "Blue Center" Steel Wire Rope on the job wherever the going is tough.

Roebling is learning every day the ways to make "Blue Center" better than ever before. Roebling development engineering, facilities and experience give it the extra stamina to meet unusual as well as routine jobs . . . to give extra service wherever extra service is called for . . . toward Victory.

It's your wartime duty to use wire ropes EFFICIENTLY!

Whatever your big job is, you've got a small but important job to see that wire rope is properly cared for on your *equipment.* To help you, Roebling has assembled a wealth of conservation data on convenient tags that operating men can fasten right on to reels and equipment. It's a simple, handy way to remind and instruct them about such vital precautions as:

1—PROPER INSTALLATION
2—CORRECT SPOOLING
3—PROPER USE OF CLIPS
4—REGULAR LUBRICATION
5—FREQUENT INSPECTION
6—CAREFUL OPERATION

Our nearest office will gladly furnish as many copies of this tag as you need. Ask for Tag "A".

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY *Branches and Warehouses in Principal Cities*

PULLING WIRES FOR PEACE!

Mile after mile of wires are being processed to speed the war effort and to hasten peace.

Day and night, the finest of steel passes through scientifically-controlled patenting furnaces, steaming vats that clean and coat, and baking ovens that dry and degasify. With unrivalled skill, through dies of jewel-like precision, it is drawn down to wire.

With scarcely a pause, spools of it in great numbers are cradled in the awesome whirr of robot-like stranding and laying machines. There, just as steadily as they were drawn down, wires are laid up again, first into strands and then into rope. In each process, strength is gained to supply tough, flexing sinews for machines which multiply and quicken man's capacity ten thousandfold.

As never before, with ever-increasing skill, our craftsmen are producing tough steel tendons for fighting machines. Before there can be war machines, however, ores, oil, coal and stone must be mined. Steel and metals must be made, lumber logged, war plants constructed and fitted. Then there must be highways, seaports and airports hewn out of the earth around the globe.

Think! Try to imagine what a limitless, hopeless, man-killing job it would be without modern wire rope to do the digging, shoveling, hoisting and countless other burdensome tasks. Then resolve to use your wire rope with great care.

UNION WIRE ROPE CORPORATION
2156 Manchester Ave., KANSAS CITY, MO.

Tulsa • *Houston* • *Chicago* • *Salt Lake City* • *New Orleans*
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SEND FOR ROPE DOPE • Tells how to make wire rope last longer—how to handle and install it—how to socket or splice—and a wealth of other helpful information. Engineering information supplied without obligation.

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**

union *Wire Rope*

"THE ULTIMATE LOW COST WIRE ROPE"

This Year Rubber Is Tapped from Test Tubes

Synthetic Rubber Already Is Working for Users of Mechanical Rubber Goods

War production is up threefold. But the vital rubber stock pile is dwindling fast. This is the year of crisis in rubber.

There is only one solution . . . the production of synthetic rubber in steadily increasing tonnages . . . synthetic rubber to take over jobs once handled by natural rubber . . . to perform new tasks, serve in new applications created by wartime need.

One of the first synthetic rubber plants in the Government's program was built and is being operated by United States Rubber Company . . . another soon will be in production.

Our engineers have been working with synthetic rubber since 1921. During this period they have learned that no one synthetic should be used for all types of mechanical rubber goods. They have found where and how synthetic is superior to natural rubber, where it is equally as good, where it falls short. They know what uses each of the five basic commercial types of synthetic rubber is best suited for — Neoprene, Buna-S, Buna-N, Butyl, or Thiokol—and how to compound the specific synthetic rubber for the specific task. U. S. Rubber has used all five types and knows which one to select for the performance required.

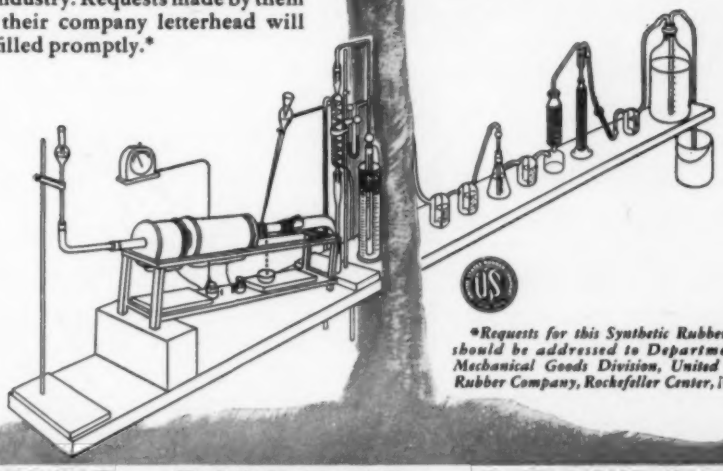
Information based on the results of vast experiments and practical applications of synthetic rubber has been incorporated in a new comprehensive book, *The Five Commercial Types of Synthetic Rubber.*

This informative book traces the history of synthetic rubber from the earliest experiments of Michael Faraday to the present. It discusses each of the basic types of synthetic rubber, tells where it has been used successfully in United States Rubber Company products, and compares its properties with natural rubber. It tells how synthetic rubber is made. It is a detailed answer to the most vital question of the day.

We feel that *The Five Commercial Types of Synthetic Rubber* is a publication of real importance to men of industry. Requests made by them on their company letterhead will be filled promptly.*

The successful use of synthetic rubber in mechanical rubber goods and the insurance of fully dependable service depend largely upon the skill of the manufacturer and compounder. Each of the five basic commercial types of synthetic permits a myriad of variations.

The United States Rubber Company has been developing and improving rubber products for one hundred years. Today, the same vast resources for research and development that resulted in some of the most spectacular achievements in the rubber industry are being devoted to the problem of synthetic rubber. A great backlog of knowledge already has been built. More is being constantly added.



*Requests for this Synthetic Rubber Book should be addressed to Department [28] Mechanical Goods Division, United States Rubber Company, Rockefeller Center, N. Y. C.

UNITED STATES RUBBER COMPANY

Mechanical Rubber Goods Division • Rockefeller Center • New York

In Canada, Dominion Rubber Co., Ltd.

LARGE MODERN CEMENT PLANTS NOW *Specify* EIMCO SLURRY FILTERS

SELECTION OF EIMCO FILTERS ASSURES OPERATING ADVANTAGES

To gain a maximum of efficiency one of America's newest cement plants included the use of Slurry Filters to secure:

1. Reduced fuel consumption.
2. Increased kiln capacity.
3. Improved control of raw material uniformity.
4. High waste heat boiler efficiency.
5. Increased grindability.

The importance of these factors in modern design involved the selection of Slurry Filters which were more than just the conventional machine. Before orders were placed, specifications were carefully developed, advantages in construction carefully studied and maintenance and operating costs investigated. Eimco Cement-Slurry Filters were finally chosen.

Eimco Filtration Engineers are available for consultation and advice. Write us about your filtration problems.

THE EIMCO CORPORATION

SALT LAKE CITY, UTAH, U.S.A.

NEW YORK	CHICAGO,	EL PASO	SACRAMENTO
120 Broadway	111 W. Washington St.	Mills Bldg.	1217 7th St.

TO **increase** OUTPUT AND **conserve** EQUIPMENT

THE country expects our miners to produce more ore, and at the same time to make mining machinery last as long as possible—to avoid breakdowns at any cost.

This calls for blasting with Hercomite* or Gelamite*, the *modern* explosives that give maximum breakage for every dollar, explosives that lay the material down so that shovels or mucking machines can load speedily and without strain.

These explosives come in strengths and grades for almost all kinds of blasting. Many everyday users are obtaining satisfactory results with Hercomites and Gelamites for both surface and underground work.

The mining industry recognizes the extra efficiency and economy of these high-cartridge-count explosives, purchasing more of them than of any others.

In your own interest; in the interest of increased output; and to conserve equipment that is hard to replace; we urge you to consult us about Hercomite and Gelamite for your work.

HERCULES POWDER COMPANY
INCORPORATED

*REG. U. S. PAT. OFF.

946 King Street · · Wilmington, Delaware

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FREE HANDBOOK TELLS HOW TO *keep 'em drilling!*

★ Dedicated to the "Man Behind the Gun," the *Drillers Handbook* is full of practical advice on how to get more work out of your air tools. Also tells how to make them last longer. It's profusely illustrated with valuable charts, diagrams and action pictures. Here are just a *few* of the important subjects covered:

- Importance of lubrication
- Recommended oils
- Dangers of lack of oil
- The line oiler
- Starting a new machine
- Cleaning rock drills
- Dangers of worn chucks
- Wet drilling
- Use of the water tank
- Preventing freezing in cold weather
- Removing a scuff
- Drilling costs
- Examples of drilling rounds
- Shanks and bits
- Bit shapes
- Dangers of bad shanks
- Speeding up paving breaker operation
- Suggestions for the blacksmith
- Drill sharpening
- Air costs
- Hose maintenance
- Modern types of rock drills
- The detachable bit

Plus many other important subjects, data tables and repair cost record sheets. You can't afford to be without this valuable handbook. Your free copy will be sent postpaid, immediately upon request. When writing us, please mention the sizes and types of rock drills you now use.

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Chicago, Ill.	Milwaukee, Wis.	Victor, Colo.
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		Lexington, Ky.

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Purves E. Ritchie & Son, Ltd., 658 Hornby St., Vancouver, B. C.
Whitehall Machine & Tools, Ltd., Galt, Ontario

BUY U. S. WAR BONDS AND STAMPS

The CLEVELAND ROCK DRILL CO.

Subsidiary of The Cleveland Pneumatic Tool Company

CABLE ADDRESS: "ROCKDRILL" • CLEVELAND, OHIO

LEADERS IN DRILLING EQUIPMENT

He Helps BOTH His Older Brothers

HE BELONGS to a large family of wonder workers.

They are men of faith, who perceive not only the difficulties, but the ways to surmount them.

The Oldest Brother of the family is more active today than ever before. He is over 5,000 years old, but every army drafts him. His name is Military Engineering.

The Second Brother also counts his years by the thousands, although his modern name is not more than 200 years old. His work is with great structures . . . with waterways, railways and highways . . . with lighthouses, harbors and airports. His name is Civil Engineering.

The Third Brother is a youth with only a century or so to his credit. He designs . . . constructs . . . applies, sells and maintains apparatus for generating, transmitting and using power. His name is Mechanical Engineering.

He founded this company 50 years ago. Here, under the name of Rex Mechanical Engineering—Rex M. E.—he has been working for the Second Brother—Civil Engineering—by providing better machines for mixing concrete, placing concrete and for removing water.

For the duration, he is working for both his Older Brothers—to help the Oldest finish his job and retire.

Now, as in the years of peace, he designs . . . manufactures . . . applies . . . sells and maintains machinery for concrete mixing and placing, and for water removal.

While working to bring V-Day nearer, Rex M. E. is learning and applying many things that are helpful now, and may be even more so afterward.

CONSTRUCTION MACHINERY

Concrete Mixers • Moto-Mixers • Speed Prime Pumps
Pavers • Mortar and Plaster Mixers • Pumpcretes

CHAIN BELT COMPANY OF MILWAUKEE

To Help You *Increase Production . . .*

PARTIAL LIST OF STOCKS ON HAND

- Alloy Steels
- Babbitt—Solder
- Bars—Shapes
- Boiler Fittings
- Floor Plate
- Rails—Plates
- Reinforcing—Wire
- Rivets—Bolts
- Shafting—Piling
- Sheets—Strip
- Stainless Steel
- Structurals
- Threaded Rods
- Tubing—Drill Rod
- Welding Rods

Ryerson Steel-Service offers steel of every kind for extension or maintenance or equipment repair. Shipment is immediate.

Practically all of the thousand and one vital uses for steel in the nation's war effort are served by the wide range of steels quickly available at Ryerson. A nation-wide organization of ten Ryerson Steel-Service plants is ready to furnish the steel you need.

True, wartime demand has cut into Ryerson stocks, but by working with us you can probably get steel if it's anywhere to be had. Whether your problems involve procurement, application or fabrication you can depend on Ryerson to help you meet your requirements. Call Ryerson for prompt action when you need steel.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON STEEL-SERVICE

PROJECT PLANTS

W. D. M. ALLAN, director of promotion, Portland Cement Association, in a brief but pointed talk to the National Concrete Masonry Association at Chicago, February 16, made a suggestion in line with our editorial discussion of post-war prospects, January issue, p. 38. Mr. Allan's suggestion went beyond ours, which stated that if post-war construction takes the form of large construction projects remote from established plants or metropolitan centers, we may see more nation-wide organizations prepared to move producing equipment to the site of the project, rather than move the materials long distances. Mr. Allan's suggestion was to dismantle presently idle concrete products plants and set them up on war projects where their output would find an immediate outlet.

Carrying his idea into post-war markets, Mr. Allan suggested specially designed portable plants, or portable units of plants, which could move about the country to take care of demands where no adequate local plant exists. So far as we know, machinery designers have not given much thought to portable products plants, but the idea is worth thinking about. As he pointed out, the great advantage concrete building products have over all competitive products is that the raw materials for concrete are available everywhere, and the manufacture of the building products themselves may take place as near the site of the job as may be desired.

Of course, "gypsy" plants do not appeal to many established producers or products manufacturers. Portable plants were fought by established aggregates producers when they first made an appearance. So the portable plant manufacturer was driven to selling county highway officials and other local authorities who became very obnoxious competitors. Gradually manufacturers perfected the equipment and there evolved the moveable plant—the transient plant—with separate portable units, which, with decent raw materials, could turn out satisfactory aggregates in sufficient volume for most highway jobs. Development of large federal construction projects, first dams, later war projects, led to *project plants*, which sometimes are superior in some details to older permanent plants.

Commercial producers woke up to this trend, got busy and eventually gathered much of this kind of aggregate production into their own organizations, which was, and is, the logical answer. Many commercial plants were designed and built to serve what were conceived to be permanent markets. For example, railway ballast. Some 25 years ago, the backbone of the commercial crushed stone business, in the East anyway, was railway ballast. Even then most main lines were well ballasted, but the producer was assured that proper track maintenance required 3 per cent of new ballast every year, so that with a few hundred miles of track to serve, the rock or gravel plant was assured steady production indefinitely.

During the last dozen years that amount of maintenance ballast has not been required. It was found by experience that roadbeds eventually became stable and not 3 per cent of ballast was pounded in every year any more. Then railway machinery builders brought out equipment to clean old ballast, so it could be reused; and ballast business dwindled.

Similarly, large sand and gravel plants were built near metropolitan centers during building booms. Now it is doubtful that the large cities will ever experience again such booms as the 1920's, because the tendency of the last ten years has been dispersion of industry and business, partly to avoid high local taxes; partly because of the movement of populations into suburbs and smaller nearby cities. The telephone, automobile, and paved highways have made unnecessary concentrations of industries in big cities. The goal of the ordinary working man is to have a home in the country and a garden.

Other aggregate plants were constructed to provide for paving a network of state highways. Maintenance and rebuilding, widening, grade crossing eliminations, etc., will provide for some output from these plants, but many are obsolete for efficient production at reduced capacity, and as they are rebuilt, are not designed for their original output. Increase in freight rates is a factor, which by shortening the radius of market territory served profitably has cut down potential plant capacities.

Also, we must not overlook the fact that processing sand and gravel aggregates has made considerable progress, and more progress will be made, which means better aggregates with poor raw materials. The cost of more processing and more wastage, of course, will have to be less than the cost of transportation from more distant plants.

None of these factors is likely to change in the near future; and forward-looking producers may well be thinking of taking their plants to projects rather than waiting for projects to materialize near plants —think more and more in terms of *project plants*.

Nathan C. Rockwood

HINTS AND HELPS

Remote Control for Hopper Gates

ILLUSTRATED herewith is a simple device for controlling the rate of feed out from an aggregates hopper to a belt conveyor without walking down under the hopper to make manual adjustments of the gate opening. This device is used in a new batching plant of the Arrow Sand and Gravel Co., Columbus, Ohio, for control of feed from two track hoppers to a belt conveyor which empties into a bucket elevator to fill bins. There is a pulley on the hopper gate shaft and one conveniently located alongside the belt conveyor, on a shaft with a hand crank on the other end. A continuous chain is wound once around each pulley, which is similar to a sprocket in that there are depressions around the pulley as shown, into which the chain links seat themselves when the crank is turned either way. Thus, the gate opening can be changed a positive amount determined by the exact distance between chain links.

Hopper gates controlled by chains. There are two hoppers, one back of the hopper shown in the illustration

Determining Horsepower From Ammeter Readings

By JOS. A. SETTER*

UNDERLOADED INDUCTION MOTORS operate at very poor power factor and draw an excessive amount of lagging current. This in turn wastes vitally needed power in all feeders and in distribution equipment clear back to the generating station power.

Frequently these difficulties can be overcome by checking the load and, on the basis of such a check, switching motors on some of the machines to improve the load factor. Loading on integral-horsepower induction motors can be easily determined with practical accuracy by means of a hook-on volt-ammeter.

This method is of unknown origin but has been used with practical results by several plant electricians for a number of years, and has been checked for accuracy with design data of motors. With this method it is not necessary to lose productive time, because the leads to the motor need not be disconnected to make the tests.

Here are the seven simple steps to be taken in using this method:

1. Plot a chart with "% hp" against "% full-load amperes" for each motor.

2. Locate point A as 100 percent from motor nameplate reading of amperes at rated hp of motor. (Also it is assumed that the nameplate voltage is maintained.)

3. Disconnect motor from load and read no-load amperes with ammeter and locate point C in percent of full-load current (approximately 25 to 45 percent depending on speed of motor).

4. Locate point D halfway between O and C and draw line DA.

5. Locate point B on line DA at 50 percent of the motor hp rating and draw CB.

6. Then line ABC will be the approximate curve of the percent horsepower output of the motor plotted against percent of motor current.

7. For any motor current, read in amperes, calculate the percentage of the full-load current, follow horizontally until line ABC is intersected.

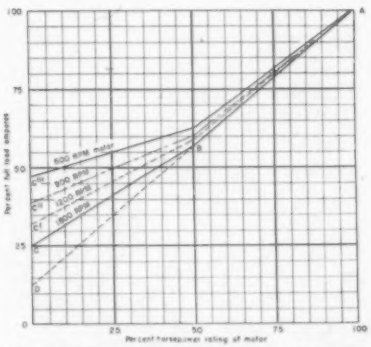


Fig. 1: Curve for estimating horsepower output of a motor at any load by hook-on-volt-ammeter readings

Then drop down vertically and read the percent load of the rated hp of the motor.

If it is not convenient or feasible to disconnect the motor from the load as suggested in Step 3, then the no-load current can be taken from Fig. 1.

* Industrial Department, General Electric Co., Denver, Colo.

Left: Arrangement for regulating opening of gate at hopper feeding belt. It comprises a crank and chain rope reeved over sprocket which has depressions to positively engage chain links. Right: Diskoperates turnspout for aggregates on top of plant. Crank is above

For example, an 1800-r.p.m. motor has a no-load current of approximately 25 percent which is the average for motors up to 100 hp. Lower speed motors have higher no-load currents, in the order of 45 percent of full-load current for 600-r.p.m. motors.

It may be surprising to find that the no-load currents are as high as that shown in Fig. 1, but it should be remembered that the no-load current is nearly all magnetizing current at practically zero lagging power factor and that the actual horsepower input from the power system is very low. This accounts for the rather high currents below one-half load where the efficiency of the motor is also lower.

From one-half to full load, it can

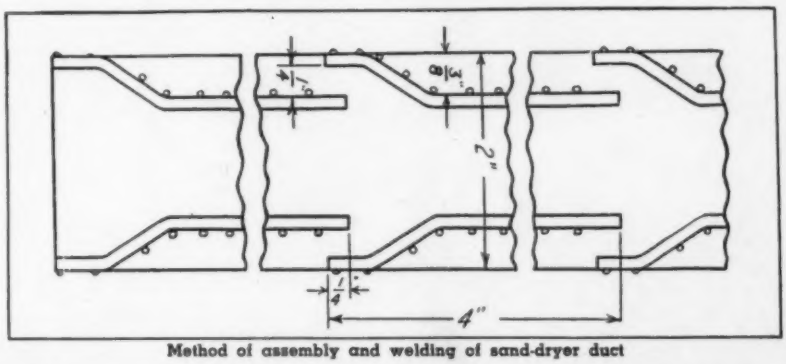
Fig. 2: Applying hook-on volt-ammeter, G.E. Type AK-1, to measure motor current

be seen that the motor current is roughly proportional to horsepower output because both efficiency and power factor are higher and more nearly constant. Above full load, the current continues to increase in direct proportion to the load up to 125 percent of full load. This can be useful as a guide in carrying out wartime recommendations on increased motor loadings.

Thus we have a timely, practical, and time-saving way to determine the horsepower that an a-c motor is delivering just from an ammeter reading. Accuracy of between 2 and 3 percent can be expected, subject of course to the ammeter accuracy tolerance.

Another advantage to be obtained by the hook-on volt-ammeter is that the voltage applied to the motor can be read simultaneously with the current. It is obvious that a motor must have the proper voltage applied or the current will be too high and overheating will result. This will also give an indication of the loads on feeder copper so that remedies can be applied.

It is hoped that this method will serve as an additional tool to help in the war program of utilizing all materials to the best advantage. Proper motoring is a patriotic necessity to conserve vital materials. Overmotoring is a tacit admission of insufficient knowledge of the machine and during wartime it is almost a crime. This is particularly true under present wartime conditions when every available power unit must be operated up to maximum capacity.



Method of assembly and welding of sand-dryer duct

Paddle-Wheel Barge Moves Small Dredge Plant

DON HARTS has been operating a rather unusual small sand and gravel dredge near Worthington, Ind. The plant is mounted on platform supported by steel tank floats which may be moved when the river is 3 ft. above normal level.

This plant is moved by means of a unique self-propelled steel barge by means of paddle wheels powered by a Fordson tractor. A hoist is mounted at the prow of the barge for handling barrels of oil and fuel for the dredge boat. There is also a loader made from an old Model A Ford.

Paddle wheels propel dredge barge which is powered with a tractor engine

Rapid Sand Drying

IN THE ACCOMPANYING SKETCH is shown an arrangement for drying sand which appeared recently in *Engineering and Mining Journal* that undoubtedly has applications in the sand and gravel field. This arrangement consists essentially of ventilating pipes arranged vertically in a dryer for locomotive sand to aid the escape of steam, substantially reducing the time required to dry rather wet sand. Although an ordinary 1-in. steel pipe with holes drilled through its wall will let some of the steam escape, a more efficient vent is one with bottom entrance holes, providing only loose sand next to the vents and preventing the entrance of sand into the duct.

The sand dryer duct is made with ⅛-in. steel with the aid of an arc welding machine. Two plates are cut 2 in. wide and as long as the duct. Next a number of plates 3- x 4-in. are cut from the material. Each small plate is then bent to form a louver at the bottom as shown in the sketch. The assembly is started by laying one of the long plates flat on the bench and then standing the louver plates on edge on it, as shown. The welding need be only "spots" spaced about an inch apart.

To complete the duct, the other plate is then clamped to the top or open side, and it is then "spotted" to the other sides of the louvers. Dimensions of this duct, roughly 2- x 3¼-in., may be unsuited to certain dryers. Without changing the size or shape of the louver plates the duct may be assembled to a thinner dimension by using 1½-in. instead of 2-in. side plates. If the ducts are installed on 12-in. centers so that it is necessary for the steam to travel not over 6 in. horizontally through the wet and packed sand, the drying will be speeded up.

NEWS ABOUT PEOPLE

Elected Vice-President

JOHN CURTIN, JR., was recently elected resident vice-president and general manager of the American Lime & Stone Co., Bellefonte, Penn.

John Curtin, Jr.

Mr. Curtin will direct and coordinate all department operations of the company at Bellefonte and Union Furnace and will handle all outside and other community relations in the Bellefonte area. He was also elected a member of the Board of Directors.

For several years during his summer vacations from Lehigh University, John Curtin, Jr., worked in the plant of the American Lime & Stone Co. In 1930 he graduated from Lehigh with a B.S. degree, and for about a year thereafter he worked full time in the plant until he was transferred to the sales department. The name of Curtin has long been associated with the American company as John Curtin, Sr., assistant sales manager, started his career there 20 years ago.

President and Treasurer

W. C. HENNING has been elected president and treasurer of A. Leschen & Sons Rope Co., St. Louis, Mo. John A. Leschen has been appointed vice-president in charge of plant and production, and James A. Burns has been named secretary.

Fluorspar Chief

HARVEY T. MUDD has been appointed chief of the fluorspar section, Office of Operations, War Production Board, Washington, D. C.

Joins Calaveras

MARTIN ULDALL, formerly with Pacific Portland Cement Co., San Francisco, Calif., has joined the Calaveras Cement Co., replacing Thomas J. Walsh who has resigned to accept a position in Honolulu. Both men are well known in the lathing and plastering industry on the West Coast. Mr. Uldall was formerly associated with the Standard Gypsum Co., Inc.

On Active Duty

CAPTAIN NELSON W. PICKERING, USNR, has been ordered to report for active duty in the United States Navy and accordingly has resigned as president of Farrel-Birmingham Co., Inc., of Ansonia, Conn., and Buffalo, N. Y. Captain Pickering has been assigned to duty as Commander of U. S. Navy Section Base at New London and commander of local defense forces in that area. Before coming to Farrel-Birmingham Co. in 1919, Captain Pickering served for 15 years in the Navy. He graduated from the United States Naval Academy in 1908.

W.P.B. Director General

CURTIS C. CALDER, formerly W.P.B. assistant deputy director general for Industry Divisions, has been appointed W.P.B. director general for operations, succeeding Ernest Kanzler, who has resigned. DR. ERNEST W. REID, formerly chief of the W.P.B. Chemicals Branch, succeeds Mr. Calder as deputy director general.

Elected President

JAMES H. ACKERMAN, vice-president in charge of sales, Lawrence Portland Cement Co., Northampton, Penn., has been named president of the company, succeeding Warren W. Ayres. George F. Hetfield, attorney, was elected a member of the board of directors. Marion S. Ackerman, Sr., father of Mr. Ackerman, was re-elected a vice-president of the company. All officers also serve as members of the board. Other directors reelected were Asa F. Randolph, Townsend Rushmore, Edward Bauer, Victor M. Cutter, William J. Minsch, and Marion S. Ackerman, Jr.

Resigns

HERBERT C. ENOS has resigned as project manager of mines and mill for Basic Magnesium, Inc., Luning, Nev., and is at home in Chatsworth, Calif.

Transferred

WILLIAM A. BATES has been transferred to the Luning, Nev., operations of Basic Magnesium, Inc. He had been in Golden, Colo., doing experimental flotation work at the Colorado School of Mines experimental plant.

In the Navy

EBER E. JAQUES, formerly a salesman for the Southwestern Portland Cement Co., Los Angeles, Calif., has been commissioned a Lieutenant in the Armed Guard of the U.S.N.R. and is stationed at the Brooklyn Navy Yard.

Appointed Director of Sales

RALPH K. GOTTSHALL of Seattle, Wash., formerly manager of the northwestern district of the Atlas Powder Co., has been appointed director of sales of the explosives department and will now be stationed in Wilmington, Del., at the general offices of the Company. WILLIAM T. MAHOOD, formerly with the contractors' section of the company, will succeed Mr. Gottshall as manager of the northwestern district.

Ralph K. Gottshall

Hawaiian Visitor

ALLAN RENTON, president and manager of Hawaiian Gas Products, Ltd., Honolulu, Hawaii, was a recent visitor to the offices of ROCK PRODUCTS. Mr. Renton is well-known to many lime producers in this country as a manufacturer of lime in the United States' possession which has been very much in the news.

Made Treasurer

CHARLES BALDUS, secretary, San Antonio Portland Cement Co., San Antonio, Texas, has been elected treasurer of the San Antonio Manufacturers' Association.

Elected Director

ALBERT R. GREEN, vice-president in charge of the Berea Abrasives division of the Cleveland Quarries Co., Cleveland, Ohio, has been elected a director of the company, replacing Herbert W. Caldwell, formerly president and chairman of the board, who retired from the latter post about three years ago because of ill health. Other board members were reelected.

Added Duties

THOMAS CHALMERS, vice-president in charge of manufacturing operations for Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., has assumed the duties also of vice-president in charge of materials.

General Manager

ARTHUR R. HALEY, sales manager of the Columbia Cement Division, Pittsburgh Plate Glass Co., Zanesville, Ohio, has been named general manager. Prior to coming to Zanesville, Mr. Haley was president of the J. R. Loomis Coal and Supply Co. of Akron, and vice-president of the Akron Coal Co., which owned and operated a number of mines around Cambridge.

Arthur R. Haley

G. R. GRIMSLEY is now superintendent of the Columbia Cement Division plant at East Fultonham. Mr. Grimsley has been with the company

Reed Grimsley

24 years. He came to the plant in June, 1924, as assistant chemist. Two years later he was promoted to chief chemist. In 1931 he was made assistant superintendent.

Sells Business

WILLIAM S. ROGERS, who will leave soon for service with the U. S. Navy, announces the sale of an interest in both his road construction business and in the Georgia Sand and Stone Co. to P. Turner Scott of Decatur, who recently resigned his position as contract manager for the National Cement Co., Birmingham, Ala., and is now engaged in completing the contracts held by Mr. Rogers with the War Department. Both business enterprises will continue in full operation under the management of Mr. Scott and Mrs. Rogers. Mr. Scott is a lifelong friend of Mr. Rogers and has been associated with him in other business enterprises. The Georgia Sand and Stone Co. has recently been awarded a sand contract at a National Defense project located in North Georgia. Work on this contract will begin at an early date and will require several months for completion. Associated in this operation will be Miss Jane Clepper and V. C. Strickland, both of whom until a few weeks ago were with the Graystone Aggregate Corp., Macon, Ga.

Manages Mica Mine

J. P. NORRIE is managing director of Purdy Mica Mines, Ltd., operating a new property 13 miles northwest of Mattawa, Ont. Excellent crystals of white mica are found in the deposit and so far shipments of crude mica have amounted to 2000 to 3000 lb. per week. At Mattawa the company has established a trimming and grading shop, with 34 girls and three men as operatives. The finished product is sold to the Colonial Mica Corp., of New York.

Resignation

ROBERT W. MCALLISTER, superintendent and general manager, Columbia Cement Co. plant of the Pittsburgh Plate Glass Co., East Fultonham, Ohio, has resigned.

Diesel Consultant

C. L. CUMMINS, founder and president of the Cummins Engine Co., Columbus, Ind., has been appointed executive consultant on Diesel engine production to the War Production Board, with headquarters in Washington, D. C. Appointment of Mr. Cummins to this newly created post is the result of a conference held recently in Washington at which time W.P.B. officials stressed the need for increased production and urged the selection of an executive from the principal diesel manufacturers to undertake this important job.

C. L. Cummins

Wagon drill which is used in quarry and also for strip-blasting

Rolls Do the Entire Job

All secondary and finish grinding at Paul Frank Quarries handled by roll crushers, including a new three-roll type

By WALTER B. LENHART

FOR MANY YEARS Paul Frank, North Vernon, Ind., conducted a crushed stone business using portable equipment for the most part. In this way he gained a keen insight into the business and its operating problems. In 1932 he established his first permanent plant at its present site a few blocks from the edge of town. In addition he had a temporary plant south of Versailles, Ind., built in 1941, which he sold late in 1942 to the McNamara Construction Co. This plant was later moved to New Foundland.

In January of 1939 he started remodeling and changing his North Vernon plant. Changes included the installation of a new Pioneer Engineering Works primary crusher, and the replacement of all the conveyors and screens until now his plant is 100 percent Pioneer equipped. It is also noteworthy because it uses roll crushers for all secondary and final crushing.

Unusual Roll Crusher

As the plant near Versailles also used rolls, the experience of Mr. Frank with this type of equipment is not confined to a single installation. This is ample evidence that he likes and approves of that type of reduction equipment. Factually, he thinks that the possibilities for continuous and economical operation by the use of rolls has been overlooked by many.

Owing to increased demands for agricultural limestone during May, 1942, he installed as an experiment a third set of rolls that are a radical departure from standard roll practice. This equipment has three rolls, instead of two as in most installations.

This unique installation consists of a standard set of 22- x 40-in. Pioneer rolls with one roll shell being plain and the opposite fluted. Mounted above the rolls and held in place by suitable heavy take-up springs is the third fluted roll that is driven from the other rolls. The feed comes into the side of the machine as shown in the illustration and at a point just below the top fluted roll. This third roll tends to act as a primary reduction unit for the other two rolls below it. The two lower rolls are spaced $\frac{3}{8}$ to $\frac{1}{2}$ in. apart, the upper roll being spaced 1 to $1\frac{1}{2}$ in. from the No. 2 roll, as illustrated, and acts as a primary crusher when the feed is $1\frac{1}{2}$ to $3\frac{1}{2}$ in. or larger. Material readily drops off the No. 2 and No. 3 rolls, and no difficulties are experienced. Paul Frank, the owner, considers this machine a successful two-stage roll crusher. It is the first in-

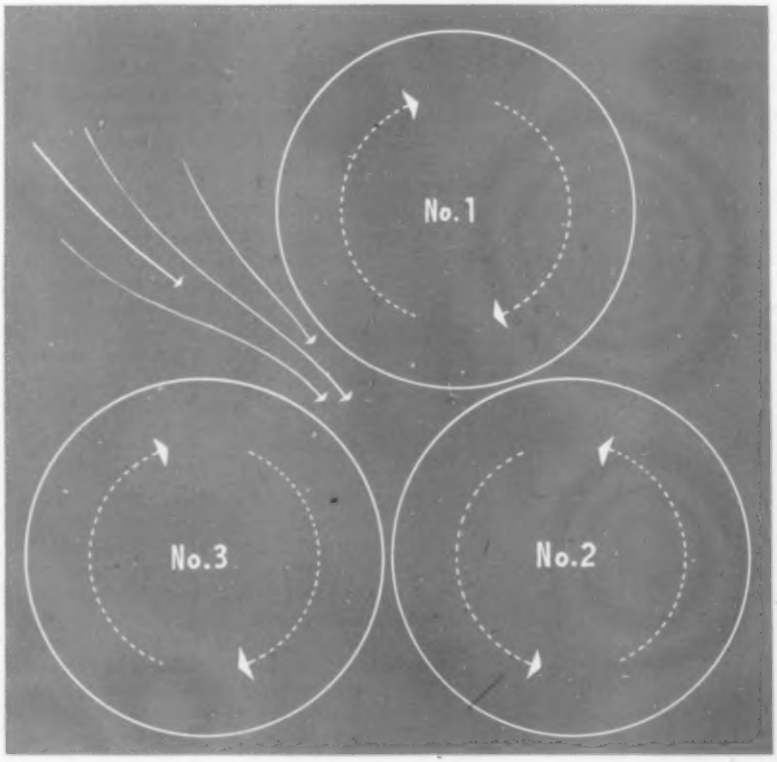


Diagram showing position of three-roll crusher and direction of feed

General view of Paul Frank Quarries. Overburden is an oil shale deposit. Note well-maintained quarry floor

stallation of its kind that we know of, and so far the experiment is working out satisfactorily. Later we will have more to say regarding his other two sets of Pioneer rolls.

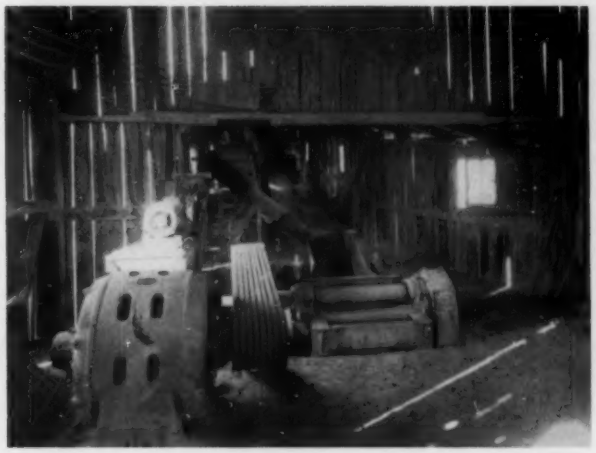
Crushing Operations

The first novelty encountered in the plant is the feeding device for the primary crusher. This is essentially a pan feeder, but instead of pans there are pipe-like cross members with a 5 in. horizontal space between each pipe. Thus any quarry stone that is minus 5 in. can drop through these grids, and fall to the 30-in. offbearing crusher belt, and the plus 5-in. material is fed slowly into the crusher. The feeder is 40 in. x 10 ft. and is installed with its long axis at right angles to the crusher eccentric shafting and so located that trucks dump direct onto the feeder. This is another "first," being the first unit of this type that Pioneer Engineering Works made and it, too, is working highly satisfactorily.

The primary crusher is a 30- x 42-in. Pioneer and is unusual in that it has an all-welded steel frame. It is of the overhead eccentric type with reversible manganese steel jaws. The 75-hp. Allis-Chalmers motor that drives this unit, through a flat belt drive, also drives the feeder. The feeder is driven by a roller chain drive from the crusher. The adjusting mechanism for regulating size of crusher discharge (ordinarily set at minus 5 in.) operates through a pair of worms and gears which operate two adjusting screws simultaneously so equal movement of the wedges are obtained. This prevents misalignments and consequent heating. The safety toggle is so designed that it will shear if tramp iron endangers the mechanism. Here again, is another piece of equipment that was the first of its type to be sent out of the Pioneer Engineering Works. When we asked Mr. Frank how he liked the crusher he said, "It's a honey."

The crusher products fall to an inclined 30-in. belt that delivers to a rebuilt 3- x 6-ft. Simplicity vibrating screen. This is a scalping screen and is provided with 4-in. square wire cloth. The undersize passes to a long inclined belt serving the main screening plant, and the oversize falls to a set of 54- x 24-in. Pioneer rolls. These are of the slugger type and have fluted manganese steel shells. The fluted shells are synchronized so as to mesh somewhat like an ordinary set of gears. However, in practice it has been learned that the rolls function properly whether they synchronize or not. This is especially important when one considers the fact that roll shells can creep on their cores (and often do) in which event the shells would not synchronize (or mesh).

When roll crushing was first pioneered many years ago it was the



Left: Looking down on third roll of three-roll crusher; feed chute to the right. Right: Secondary set of rolls driven through V belts

Tractor equipped with bulldozer is a useful tool in the quarry to clean up after shovel and to keep roadways in shape

practice to drive one roll with a flat, straight belt. The other roll was driven by a second flat, but crossed belt and both from the same line shaft. This was a cumbersome installation. At this crushing plant the power is applied to the countershaft, transmitted to the stationary roll through a pinion and gear, and then to the floating roll through a pair of star gears that are enclosed and which run in oil.

The teeth of the star gears are long and so designed as to make a practical gear drive regardless of the spacing between the faces of the two rolls. The star gears are of about the same pitch diameter as the rolls. This set of rolls weighs 38,100 lb. and is driven by a 150-hp. General Electric motor through V-belt drives.

Due to the use of fluted roll shells, this unit can take 6-in. feed rock as a maximum size. This contrasts with 2¾-in. rock had plain smooth shells been used. Normally this machine reduces the rock to 1⅜-in. size. It has a capacity of 150 tons per hour taken

Trucks dump into grid-type feeder to primary crusher

as an overall average. The tonnage will vary with the fineness. The machine last year treated 300,000 tons of stone. During the two years it has been installed the faces of the shells have been built up twice with manganese steel electrodes. It has proven to have a large capacity, a large ratio of reduction, and handles wet, sticky material without trouble.

This set of rolls discharges to the previously mentioned, long inclined belt conveyor that delivers to two parallel 4- x 10-ft. Pioneer vibrating screens that operate dry. Immediately below and in line with the above two screens are two 4- x 8-ft. Pioneer vibrating screens that can operate either wet or dry so that either washed or dry stone can be produced simultaneously. These screens are equipped with Timken roller bearings. The pans are balanced and weight counterbalanced in the fly wheels, with a minimum of vibration transmitted to the foundation members.

If desired, the oversize passes to a horizontal belt conveyor that delivers the material to the second set of Pioneer rolls. These are 22 x 40 in., one roll having a smooth face and one fluted. This unit will take 3-in. material and reduce it to any predetermined size in the plus ½-in. range. It requires a 75-hp. motor and operates at 460 lineal feet per minute roll surface speed. The percentage of each size produced can be somewhat controlled by the setting of the shell. This unit will handle around 80 tons per hour when reducing to 1 in. The throughs from this set of rolls falls to the long inclined belt previously mentioned serving the screening plant.

The third (3-roll set) of rolls are 22 x 40 in. and are intended for the production of the finer sizes of stone and especially agricultural limestone. Mr. Frank enjoys a large business in that field. The product from this set

Left: Vibrating screen which has been rebuilt to serve as a scalper. Right: Motor to the left drives the jaw crusher, and the belt conveyor in the center feeds the scalping screen

Crushing plant is completely enclosed. The three-roll crusher is in the building to the left

of rolls is elevated by means of a bucket elevator to a 4- x 8-ft. Pioneer vibrating screen for the final sizing of the agricultural (and small diameter) stone. The plant, as a whole, ordinarily produces six sizes of stone simultaneously.

All of the three sets of rolls are of heavy enough design and feed with the proper size of stone so that all units run smoothly and quietly.

Owing to the several defense jobs in the area very little material is accumulating in the stockpiles which are simple ground storage piles and reclaimed by Haiss loaders. All deliveries are made by trucks.

The plant was designed cooperatively by Mr. Frank and Pioneer Engineering Works and built by Paul Frank, president and owner of the operation. George Pearcy is office manager.

The Quarry

The overburden is unusual. It is an oil shale and is from 25 to 30 ft. thick. This, as well as the limestone, is drilled with Worthington wagon drills using Atlas Geolodyn No. 1 powder. The overburden or rock is loaded by one of three Koehring shovels as he has available a No. 401, 501 and a 604. Ingersoll-Rand and Worthington compressors supply air for drilling.

Yard loading is facilitated with crawler tread loader

Cement Kilns for Sponge Iron Production

UTILIZATION of rotary cement kilns to make sponge iron to keep the industry going was advocated by Dr. Harvey N. Davis, director of scientific research and development for the War Production Board, and president of Stevens Institute of Technology, in an address at the annual meeting of the American Institute of Mining and Metallurgical Engineers.

Compared with the total of about 64 million tons of pig iron produced in this country, the estimated production of sponge iron from cement kilns would be very small, perhaps around 500,000 tons. Despite the small production and the minor position of sponge iron in the iron industry, Mr. Davis expressed the opinion that the move would be a material help in keeping the kilns as well as the sponge iron industry going. The iron, he said, might be produced without any great change in the kilns. In any event, he added, the final product "at least would be sintered, partially reduced, good blast furnace feed, and anything beyond that is gravy."

Dr. Davis is at least a year behind the times in his suggestion, which was made long ago in ROCK PRODUCTS —after its editors knew that cement kilns were already being used to sinter iron ore. There is a method, the Basset process, invented by a Frenchman and first installed in Spain, for making pig iron and portland cement in a rotary kiln simultaneously. This process was described in detail in ROCK PRODUCTS, July, 1936, pp. 48-51, by Denys Choffat, the engineer who made the Barcelona, Spain, installation. The chief factor in the process is operating the kiln with a reducing flame, which combines the oxides of the minerals to form portland cement clinker, but reduces the iron oxide, forming iron, which is tapped off ahead of the clinker. The clinker floats over it.

R.F.C.'s Bellefonte Lime Investment

REFERENCE was made on p. 18 of the "News Flashes" in ROCK PRODUCTS for January to the decision of the Defense Plant Corporation not to lend government capital for new lime plants. It was said the Reconstruction Finance Corporation's previous experience at Bellefonte, Penn., was a factor in its successor's (D.P.C.) decision. The reference, of course, was to the R.F.C.'s loan to the Chemical Lime Co. We are informed that when the National Gypsum Co. took over the Chemical Lime Co. properties, National assumed all of Chemical's indebtedness on the principal advanced by R.F.C., and all obligations have been fully carried out. Thus, while the R.F.C. had some uneasy years about the security of its investment in the lime industry, it now has none, thanks to the good management of the National Gypsum Co. and its financial strength.

Lime Remains in Group III of Critical List

THE WPB has issued its Seventh Material and Supply List which is compiled bimonthly to reflect the relative current supply or status of materials useful to the war program. Lime is still included in Group III, a list of materials that are considered available in quantities significant enough to make them available as substitutes for scarcer materials, unless supplies are restricted locally by labor, manufacturing, or tranportation difficulties, according to a National Lime Association bulletin.

Rock Wool Plant Burns

GUARDIAN ROCK WOOL CO., Easley, Mo., lost its entire plant and equipment in a fire which completely destroyed the frame and metal sheathed structure. The loss is estimated at $50,000.

SCRUBBING

How California Rock and Gravel Co. Cleans Aggregates, Sells Red Clay and Promotes Efficiency

By W. L. NETHERBY*

UTILIZATION OF ALL possible sources of revenue is featured at the plant of California Rock & Gravel Co., aggregate producers with facilities located between Livermore and Pleasanton, Calif.

The company produces six classes of coarse aggregates and two of sand, and has developed a profitable side line through reclamation of red clay from waste water for sale to refractory plants.

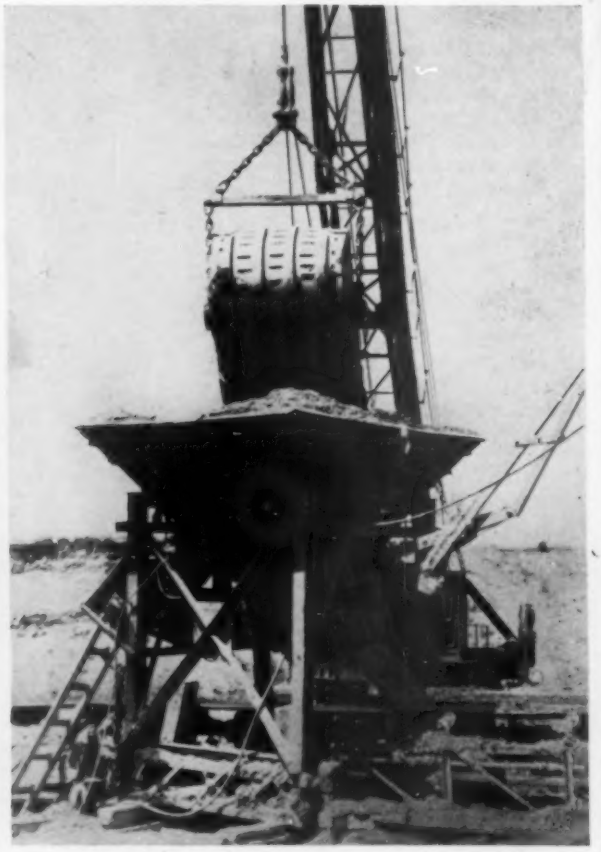
The aggregate pit is located about one-third of a mile from the plant. Excavation is done with a Bucyrus-Monighan walking type dragline equipped with a 3-cu. yd. Page bucket. With this new excavator, depths to 50 ft. are successfully reached.

Material is handled from the dragline to the plant by a series of 24-in. belt conveyor sections. The first 200-ft. section is portable, to enable it to be moved alongside the pit and thus eliminate any intermediate handling. Material is dumped from the dragline bucket into a receiving hopper equipped with a reciprocating feeder. This hopper is a specially-built structure, and may be moved easily on skids to any point along the portable section.

The initial conveyor section discharges to a section 575 ft. long, which takes the material up an incline and out of the pit. The final section of the field conveyor is 630 ft. long, and terminates at the primary crushing unit of the plant. The sections are powered by one Westinghouse and two Allis-Chalmers motors in 25-, 15- and 20-hp. capacities, respectively. Belt speed is 375 f.p.m.

Aggregates in the following sizes are produced at the plant: 3/16- to

Walking excavator at the pit loads the field conveyor



Hopper is built on skids so it may be moved conveniently

View of the plant. The conveyor in the foreground runs to the track unloading chute. Ribbon screw classifiers over bins

5/16-in.; 5/16- to ½-in.; ½-in. to ⅞-in.; ⅞- to 1¼-in.; 1¼- to 1½-in.; and 1½- to 2½-in. Fine sand is minus 4½-mesh, and coarse sand minus 3/16-in. In addition, crushed rock screenings are produced.

Scrubbing Begins

Native material is composed predominately of red clay, mixed with rock and sand. It is taken from the field belt into a rotary scrubber, which has conical screen sections at the end for first processing. These screens pass minus 3½-in. material, and discharge it via twin chutes into a Link-Belt reciprocating washer. Rejects fall directly from the conical section into a 13-in. McCully primary crusher powered by a 50-hp. Allis-Chalmers motor with multiple V-belt drive.

The main plant conveyor, a 24-in. belt 270 ft. long and traveling at 300 f.p.m., takes material from the primary installations and delivers it to the top set of screens. This is a 4- x 14-ft. Allis-Chalmers triple-deck unit. The top screen passes 1¼-in. material; the middle deck, ⅞-in.; and the bottom deck, ½-in. The ⅞- to 1¼-in. material scalped from the second screen and the ½- to ⅞-in. material from the third screen are chuted to the bunkers. Material rejected by the top screen goes to a 4- x 8-ft. Allis-Chalmers double-deck vibrating screen with 2½- and 1½-in. mesh. Material graded 2½ in. to 1½ in. is scalped off the bottom deck and sent to the bunker. The 1½-in. to 1¼-in. material passing this screen is likewise sent to the bunkers.

Plus 2½-in. material is transferred to a surge bin, and thence to a Newhouse secondary crusher. Then it is circuited back to the 4- x 14-ft. screen unit. Inasmuch as the demand for the 2½- to 1½-in. rock is less than that for the smaller grades, the flow has been arranged so that this product may be sent through the secondary crusher as the need arises.

Rock passing the ½-in. screen of the 4- x 14-ft. unit is taken to a double-deck A.-C. 4- x 12-ft. screen. The top screen is 5/16-in. mesh, and the lower is built with three screening sections. The first two sections pass 4½-mesh, and the last section passes 3/16-in. One-half to 5/16-in. material is taken off the top screen and sent to bunkers, and 3/16- to 5/16-in. is rejected from the lower screen and also sent to a bunker. Fine and coarse sand passing the lower screen goes into 48-in. Wemco twin ribbon screw classifiers, and from them to the bunkers.

Use of these sand classifiers is particularly interesting as they are relatively new in gravel plant operation in this area. They have, however, been used extensively in mine plants for a long period. They make good scrubbers.

The installation was made last year. The problem was to wash, size and dewater about 60 tons of sand per hour. The feed contained a large percentage of very fine sands and a large proportion of water—approximately 600 g.p.m. In order to save a maximum amount of fine sands as well as to overflow the slimes and water, classifiers with extra large pool areas and high overflow weirs were designed.

The two Wemco Simplex double-pitch screw classifiers, 48 in. in diameter by 25 ft. 6 in. long, have produced more than the specified tonnage. Moisture is reduced to between 12 and 15 percent.

Making Extra Sand

Product of the plant runs only about 35 percent sand, while the normal demand is for about 15 percent additional. So the 3/16-in. to 5/16-in. rock scalped off the bottom screen may be taken by belt conveyor to an 8-cu. yd. surge hopper, and thence to a Symonds impact crusher discharging to a 4½-mesh, 4- x 14-ft. screen. Material passing this is transferred to the screw classifier and rejects are sent back to the crusher.

California Rock & Gravel Co. has encountered some demand for crushed rock screenings. This material is obtained by tapping the flow from the secondary crusher, taking it by belt to a separate screening house, and

(Continued on page 70)

From track hopper and belt to primary rotary scrubber

Clarifying the Sand Blending Problem

Application of Formulas Given in October Issue

By permission of the writers we print here an exchange of correspondence between Stanton Walker, director of engineering, National Sand and Gravel Association, and Fred C. Bond, head, Minerals Research Laboratory, Allis-Chalmers Manufacturing Co., regarding the application of various mathematical formulas given in Mr. Bond's article on "Blending Sand" in the October issue of Rock Products, pp. 60 and 65. These may help others who have tried out the formulas, which should be of very practical value in making specification sand.

Mr. Walker to Mr. Bond

I have read with interest your article on sand blending in the October, 1942, issue of Rock Products. I have been interested in checking through the deriviation of the equations and comparing them with procedures which I use. I am wondering if certain limitations on Equation 2 should not be stated and if further explanation of S_n in Equation 6 is not needed.

It is evident, I believe, that Equation 2 applies only when it is considered that all of the fines which are removed come from the finest available size or sizes. Referring to your example, the 18.5 percent of material removed had to be considered as all coming from the minus 200-mesh fraction, to make the equation stand up; none of it could be considered as coming from the —100+200 fraction.

As a matter of fact, that is probably as good an assumption as any to make with respect to water classification, although I am sure that you will agree that it is not a strictly true one and becomes less nearly true as the "length" of the discarded material increases. However, I raise the question if the limitation should not be stated.

You say that Equation 2 applies "to removal of fines by air separation *or by screening* as well as by washing." It applies to screening only in a limited sense, does it not? That is to say, the screening must be done in such a manner as to remove all of the rejects from the finest sizes available. For example, in your illustration, based on too much —100, it would be necessary to make the screen separation at No. 200. If that bracket did not supply sufficient "rejects" then, after it was all removed, some of the next larger sizes would be removed.

It seems to me that the applicability of Equation 2 should be limited to air or water separation; Equation 6 appears to be the one most applicable to separation by screening.

In order for Equations 5 and 6 (Particularly 6) to be clear, it seems to me that further discussion is needed. Let us consider your example in Table 1 and assume that we wish to discard —28 material so that only 40 percent passes that sieve.

$$Z = 100\,\frac{(51-40)}{(100-40)} = 18\%$$

to be discarded. It is obvious here than $S_n = 100$ and Equation 5 becomes Equation 1.

It follows of course that:

$$P_{28} = \frac{100 \cdot 51 - 18 \cdot 100}{100-18} = 40\%$$

It also follows that:

$$P_{14} = \frac{100 \cdot 70.5 - 18 \cdot 100}{100-18} = 64\%$$

And so on for P_8 and P_4, (when S_n is still 100), but what about P_{48}, P_{100}, etc.? In the case of P_{48}, S_{48} is not 100, but

$$100 \times \frac{37 \cdot 1}{51 \cdot 0} = 73$$

and I do not believe that is obvious to the average reader.

Then,

$$P_{48} = \frac{100 \cdot 37.1 - 18 \cdot 73}{100-18} = 29.3\%$$

In my own work I have never set up equations in a formal way although I have followed a pattern which, I suppose, amounts to a series of equations and which could be represented quite well by your equations.

Mr. Bond to Mr. Walker

I was glad to learn of your interest in my article on sand blending in Rock Products for October, and will endeavor to deal with the points raised in your letter.

In the first place, you are correct in stating in applying Equations 1 and 2 the term "fines' must be limited to include only material sufficiently fine to pass the finest screen size concerned. This was stated in the article in the first paragraph under "Washing."

Referring to the fourth and fifth paragraphs of your letter, the separation obtained by screening is assumed to be complete, and the screen size at which the separation is made must be as fine or finer than the mesh of the finest screen used in the calculation. Otherwise the above definition of "fines" would not apply and Equations 5 and 6 must be used.

Equations 3 and 4 for blending, and Equations 5 and 6 for separating, must be used in all cases where the finer material blended or separated contains particles which are retained on the finest mesh size used in the calculation; or, in other words, in all cases where S_n is less than 100 percent.

Special Application

I have checked your calculations for screen sizes of 28-mesh and larger. As I derived the equations it is necessary to know the percent weight passing any screen size "*n*" in the separated product "*S*," and in the head sample *H* before P_n (the percent passing size "*n*" in the product "*P*,") can be calculated. In your example you calculated the percentage of the minus 28 mesh material which would pass 48 mesh, and used this value of S_{48} to calculate P_{48}. This is a special application that was not covered specifically in my general equations, but as you have shown, the equations apply to any case where S_n can be found, whether by calculation or by determination.

The equations have been useful in our laboratory in blending and separating problems. I appreciate your interest in them and hope that you may find applications for them.

SHIPPING

The Army Can't Wait

Henry J. Kaiser Co. sets up concrete batching plant with long conveyors designed to reduce rail and truck haulage

By A. LINDLEY

ARMY CANTONMENTS can't wait, and it's seldom that the Henry J. Kaiser Company can, either. One of the biggest contracting organizations in the country, the company has built up a reputation for getting things done the fast way—dams, aggregate plants, cement plants, magnesium plants and steel mills spring up in the footsteps of Kaiser's crew of young men.

So when they were awarded a sizeable contract for construction at one of the Army's cantonments in northern California, they set to work planning a job layout that would speed the work. One of the leading items in their bid was concrete work; there was a lot of it, and the time was too short to permit building an elaborate stationary batching and mixing plant at the site. They looked around a little, and came back with a plan involving partial use of existing facilities plus installation of new equipment that solved their problem.

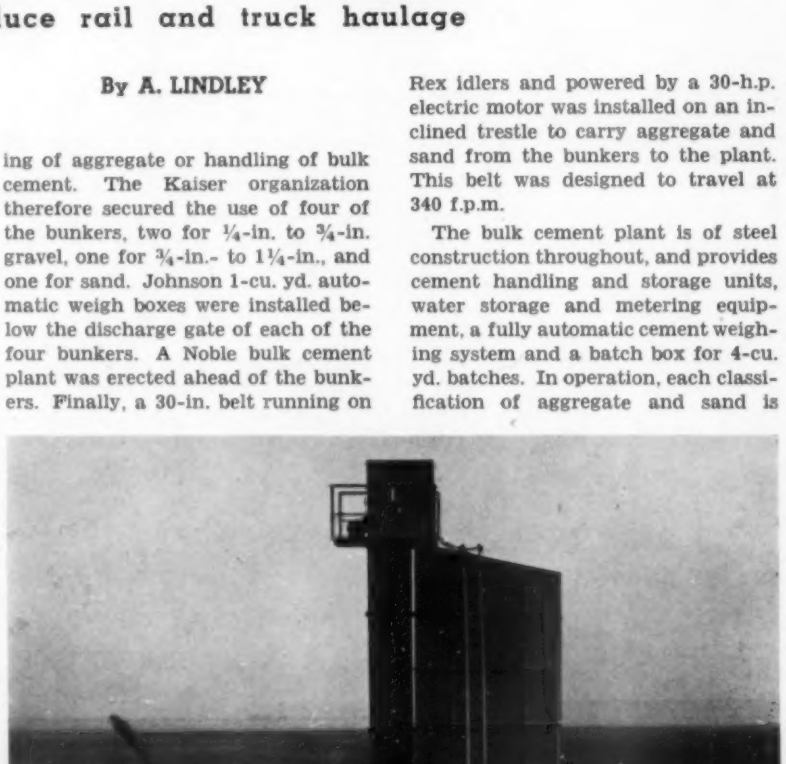
A nearby building materials company had the facilities that gave them their start: spur track, yard area and aggregate handling and storage structures. They coupled this set-up to a portable bulk cement plant, moved transit-mix trucks to the job, and in record time were delivering concrete to the project.

Batching Facilities

Existing structures included two parallel banks of 100-ton timber bunkers, twelve in all. Running alongside them was the spur track, over which came aggregates and sand in bottom-dump gondolas. Material was discharged into a track hopper, reclaimed by a 24-in. belt conveyor, and transferred via a bucket elevator to an 18-in. shuttle belt running along the centerline of the two rows of bunkers. A transfer car was used to direct the aggregate or sand by chute to the proper bunker. Link-Belt conveying equipment and Goodyear belting was used throughout.

That was the existing set-up—but it made no provision for either batching of aggregate or handling of bulk cement. The Kaiser organization therefore secured the use of four of the bunkers, two for ¼-in. to ¾-in. gravel, one for ¾-in.- to 1¼-in., and one for sand. Johnson 1-cu. yd. automatic weigh boxes were installed below the discharge gate of each of the four bunkers. A Noble bulk cement plant was erected ahead of the bunkers. Finally, a 30-in. belt running on Rex idlers and powered by a 30-h.p. electric motor was installed on an inclined trestle to carry aggregate and sand from the bunkers to the plant. This belt was designed to travel at 340 f.p.m.

The bulk cement plant is of steel construction throughout, and provides cement handling and storage units, water storage and metering equipment, a fully automatic cement weighing system and a batch box for 4-cu. yd. batches. In operation, each classification of aggregate and sand is



Looking toward the bulk cement plant from the aggregate bunkers. In center foreground is the 30-in. belt conveyor carrying aggregates to plant. At left, tracks to receive aggregates

weighed out in the boxes below the bunkers, then discharged consecutively onto the belt going to the plant's batch box.

Cement is unloaded from boxcars on the track adjacent to the plant with a car unloading shovel equipped with preformed wire rope, and is taken into a receiving hopper at the elevator boot. The elevator flights reclaim it and lift it to the top of the 2000-sack cement silo. Incidentally, the silo is constructed with bolted ring sections so that storage capacity can be varied to meet different conditions on other projects.

Weighing of cement is entirely automatic. The operator pulls a switch, starting the screw conveyor, which takes the material from the bottom of the silo to the 27-cu. ft. weigh box. When the correct weight for each batch is attained, the flow of cement is cut off photoelectrically.

After the correct amount of cement is weighed out and the three classifications of aggregate are in the batch box, the platform man pulls a lever which drops the material through clamshell type gates into the truck mixer. Simultaneously, water is automatically metered into the mixer. Transit mixers are Rex 4-cu. yd. type mounted on Peterbilt and Ford trucks.

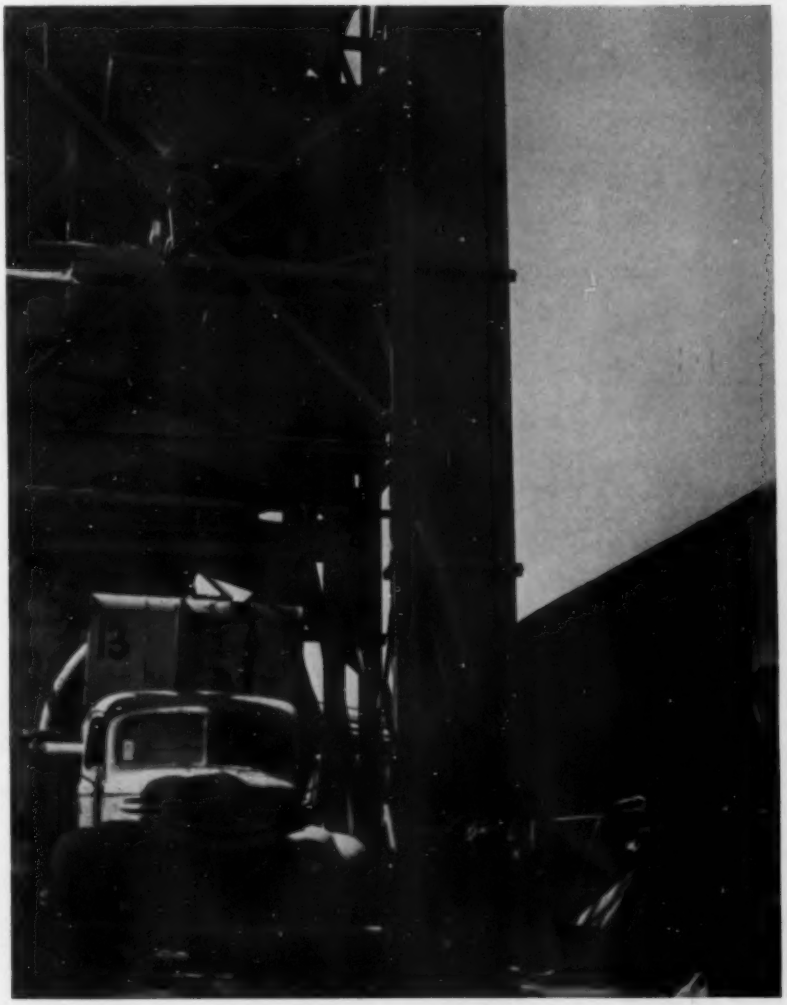
Cut Truck Haulage with Conveyor to Rail Line

With the plant completed, Henry J. Kaiser Company went to work on the contract. A stumbling block soon developed, however. Heavy military traffic caused congestion on the main railroad line serving the plant with aggregate, resulting in delays. There was another railroad line that passed about a mile from the plant, but which did not connect with the spur. Another conveyor was installed, with a 24-in. belt and speed of 420 f.p.m., to discharge into the sand bunker. A truck hopper was built at its lower terminus, and a dirt ramp was thrown up for unloading. Sand is brought in on the other line, unloaded from gondolas into trucks by a ⅝-cu. yd. Osgood clamshell excavator and hauled without delay to the conveyor. This by-pass means of transportation can relieve the load on the main line to the plant by 25 per cent, which is usually sufficient to assure continuous operation.

They found another way of speeding up production. The ⅜-in. cable

(Continued on page 68)

Transfer car running over the top of the aggregates to move aggregates from horizontal conveyor into bunkers



Transit mixer truck taking a 4-cu. yd. batch. Note bulk cement car unloader to the right which has speeded up operations

Getting Most For Electric Dollars

Cement plants may reduce electric power costs very substantially by proper selection of motor equipment

By C. D. LAWTON*

TODAY ELECTRIC POWER is used universally by the cement industry on account of its flexibility, permitting shutdowns of some plant sections while production continues in others. It reduces periods of involuntary interruption of manufacture in an industry where continuous operation is required to preserve product uniformity to meet rigid specifications. Further, the means of its distribution and utilization leave a wide latitude in formulating plans for alterations in existing plant layouts and extensions.

Lastly, an alert management will certainly want to know how much power is consumed in accomplishing the various steps of manufacture, especially in grinding, which is a continuous and costly operation. Electric power lends itself readily to the measurement and subsequent recording of departmental energy requirements, which is a valuable aid to efficient plant management.

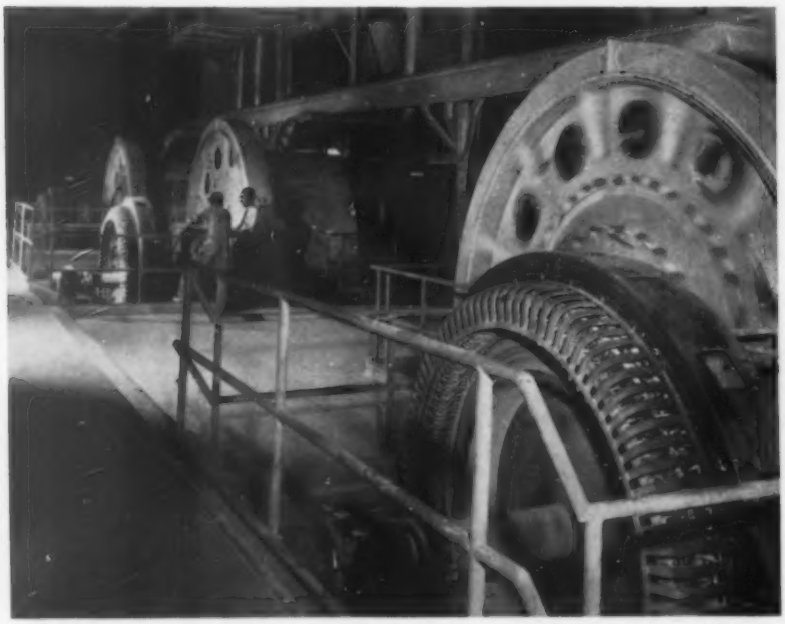
Power Source

A correct selection of the source of electric power required for cement plant operation requires careful analysis. Correct selection must take into consideration availability, continuity, and cost, if the power is purchased, compared with the overall cost when power is generated in a plant operated by the cement company.

The selection, therefore, is usually based on plant economics in which operating costs and fixed charges form the basis of comparison. Other factors, including those of plant location, must be considered; and whether the plant is located in the United States or in a foreign country plays no minor part in the final decision.

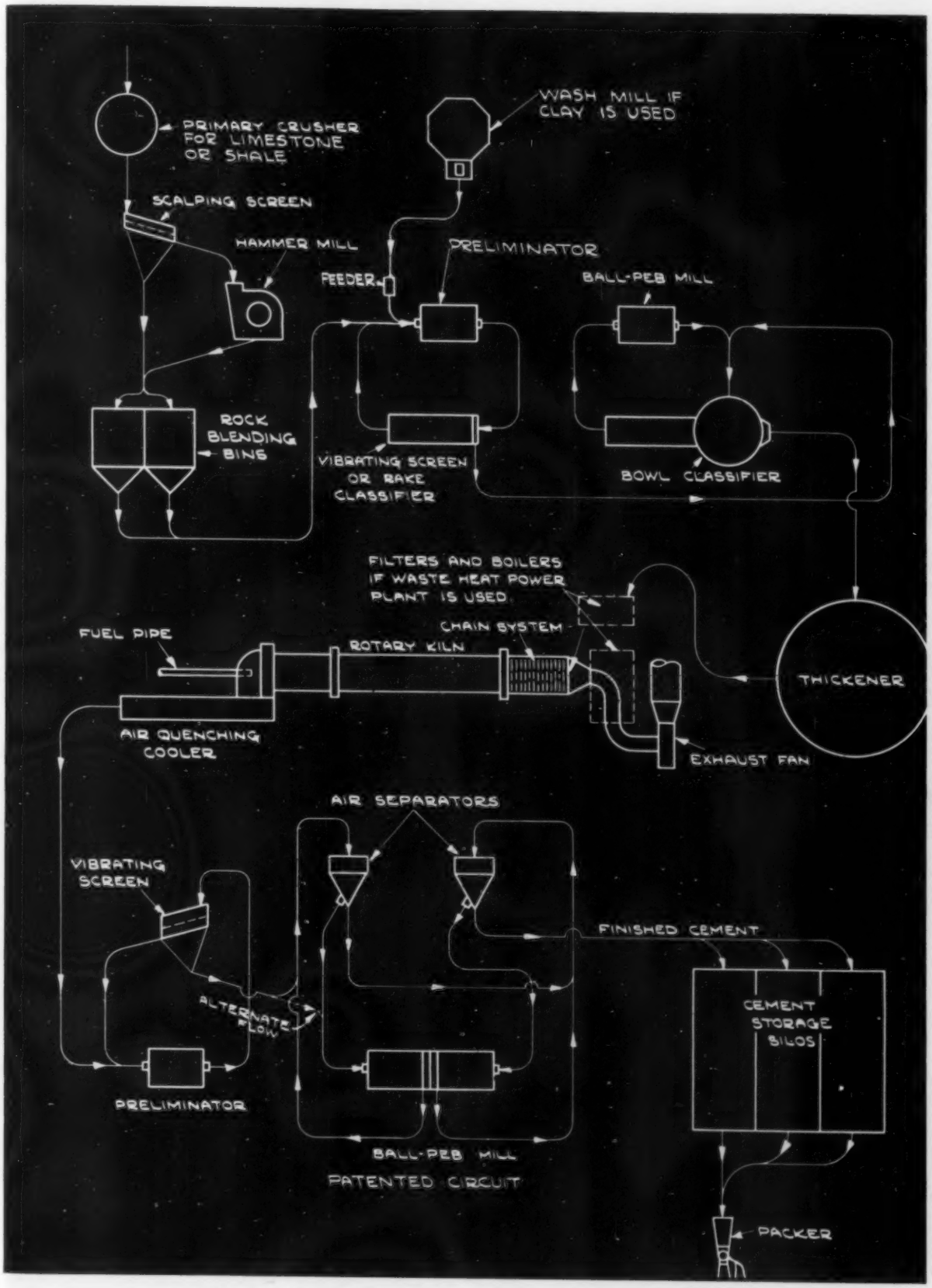
In the United States the trend toward purchased power began years ago and has continued in importance, because it has been found more economical to purchase power and to conserve fuel for burning the clinker, by the use of major improvements in the rotary kiln which have increased its thermal efficiency. In existing cement plants which employ comparatively short kilns, using either the wet or dry process, the exit gas temperatures are usually high enough to permit power generation which, in some plants, provides sufficient electrical energy to operate the entire cement plant. In such cases, the prevailing power rates determine whether the available heat from the kiln gases should be utilized for power generation. If the power rates are low enough, it may be economical to disregard the heat carried out by the kiln gases and waste it. The capital cost of waste-heat power plants is high; and the fixed charges, plus the additional fuel required in the kiln to which waste-heat boilers are connected, comprise the total power cost and, hence, the basis upon which the engineer must determine which type of power is the more economical.

In cases where the cement plant includes a fuel-fired power plant to generate the required power, assuming that the plant is an isolated one where market fluctuations may be a serious detriment to uniform power costs, steam turbines or Diesel engines may be employed—the former with at least two fuel-fired boilers, the latter with multiple units to permit operation at high efficiency when power requirements are curtailed because of a decrease in cement output. The choice which faces the engineer in the selection of power to be thus employed is an involved one, depend-



In a Southern cement plant, synchronous motors drive primary and secondary wet grinding ball mills in close circuit with classifiers

*Electrical Engineer, Allis-Chalmers Mfg. Co.



Flow sheet of typical cement plant in which there is classified wet grinding on the raw side

ing upon such factors as the availability of suitable fuel oil, fresh water for steam generation or for Diesel cooling, the skilled labor available and the production rating of the cement plant.

Because a large capital investment is required for a power generating station using either waste-heat or fuel-fired boilers, in order to keep the power costs of the cement plant at a normal rate, it is obvious that the plant should be operated at normal capacity. A power plant, in order to realize a normal return on the investment, requires continuity of cement plant operation, which in turn depends upon a sustained market for cement.

In the operation of a portland cement plant, the main purpose is to manufacture cement. This in itself is a major operating problem which involves long experience and a high degree of skill, and this should not be subordinated by altering the kiln system to include equipment for the generation of power unless the conditions are definitely indicative that it is economically sound to do so.

Trend Toward Smaller Plants

The trend in present-day plant design is toward plants of smaller daily production and located strategically with respect to the consumer market. In many cases a single kiln is used. In single-kiln plants where waste-heat power is employed, sufficient steam cannot usually be generated to provide power for the entire plant unless fuel in greater capacity than that required for efficient clinker burning is introduced within the kiln or under the boiler by direct firing. In such cases an auxiliary boiler may be installed which acts as a booster and may carry a part of the plant load when the kiln is down for repairs.

Load Factor

A consideration affecting the entire cement plant is the electrical load factor. When this load factor is multiplied by the total connected load of the plant in terms of kw. and is divided by the barrels of cement per hour, the result in kw.h. per barrel may be used to compare the electrical efficiency of the plant with that of other plants of similar capacity. This comparison is important as it will aid the plant engineers in forming an opinion upon which to base the functions of auxiliary machines, such as conveying, elevating, feeding, pumping, etc., with a view to serving double the number of units installed initially to provide for future plant expansion.

Under certain conditions a low load factor during peak hours may be desirable both for the power company and for the cement company. Where no demand charge is made for excess power during off-peak hours, it is often desirable to install excess grinding capacity. Under such conditions the net rate per kw.h. will be reduced, and the power company will be enabled to furnish a greater total amount of electrical energy by obtaining a better load factor for the power plant.

In a well designed and organized cement plant in which all extensions have been anticipated on the basis of the initial installation, the load factor should be about 75 percent.

Power Factor

The power factor is always important, regardless of the load factor. Low power factor is an enemy to economical operation. It loads the power system with wattless current which performs no useful function, but is detrimental since it causes lower efficiency and greater voltage drop through the power distribution system. The cause of low power factor is usually a preponderance of induction motors operating at partial loads. Its correction means operating the motors at more nearly their full load rating which also increases their operating efficiency. The plant power factor is usually kept within reasonable limits by employing synchronous motors for the grinding mill operations.

It is estimated that the cement industry consumes about two percent of the total electrical energy consumed by the nation for both domestic and industrial purposes. Since electric power in this country is generated and distributed by large power stations, most cement companies purchase their power from the public utility companies. However, many cement companies, where low cost power is not available in large quanti-

Three dry grinding preliminators are direct-connected to two 300-hp. and one 400-hp. motor in a far-western portland cement plant

ties, may employ other means for obtaining the necessary electric power.

Operating Conditions Are Severe

Cement plant service imposes rigorous duty on electrical equipment, particularly motors, since they often operate under extraordinary conditions of overload and in extremely dusty surroundings. The electrical apparatus, therefore, suffers from dust, abnormal loads, and often abuse at the hands of unskilled labor. Unbalanced loads, caused by crowding or congestion of the flow of materials, very often throw heavy burdens upon the motors.

Consideration must be given to the nature of the machinery which the motors drive. These machines are jaw and gyratory crushers which shatter heavy pieces of stone; grinding mills filled with tons of steel grinding media; agitators in which slurry or clay slip of varying consistency is stirred and blended; and fluctuating loads in the kiln itself due to irregularities in the kiln operation, which are the result of the variations in the chemical composition of the raw materials.

It is not difficult, therefore, to appreciate that, where operations are carried on necessarily and continuously in dust-laden atmosphere, heat, and at times abuse, the motors may be subject to unusual operating conditions. Far from being pampered, all types of electrical equipment are subjected to tests in a cement plant which inevitably reveal the quality of the machines and their ability to withstand the rigors of such service.

Cement manufacture is an operation in which the several phases of the manufacturing process are interdependent to provide continuity of operation. The prime requisite of motors, therefore, is reliability.

Because cement dust is non-conductive, in the past motors of the open type have been used. Even though the motors became clogged with dust and dirt and had to be blown out frequently, they have stood up fairly well. During recent years, however, the tendency to use enclosed types of motors has become manifest, and it has been shown that, where enclosed motors are used, their life has been considerably prolonged and repairs and maintenance expense has been greatly lowered. This also applies to control, as today with the many magnetic features on control panels involving many different types of small mechanisms, relays and protective devices whose operation can be considerably impaired by dirt and dust, they have been sheet metal enclosed. Motor control is sometimes grouped and separately located where the air is clean to insure more reliable operation with less maintenance.

Dust and dirt have also caused bearing lubrication difficulties, and for this reason ball bearings have been used which have proved superior to sleeve babbit types.

The tendency today is to load motors up to their nameplate rating which means that they will operate at much higher efficiency and better power factor. This is a movement toward economical operation, since the power distribution system will not become overburdened with wattless current, due to low power factor or wasted energy due to low efficiency. However, there are certain operations that at times become subjected to heavy overloads, and in these cases motors with liberal ratings should be applied.

Grinding Mill Motors

The grinding mills which require a large percentage of the total plant power are driven with motors ranging from 200 to 1500 h.p.; and, since these motors operate under continuous load at constant speed, the adaptation of the synchronous motor is a natural one. Unity or 80 percent power factor synchronous motors may be used, depending upon the amount of corrective kv.a. necessary to the system. It might well be mentioned here that synchronous motors will correct the total system power factor at the switchboard but will not correct for the evils of poor power factor within the plant distribution system itself. The efficiency of synchronous motors is high compared to other types of motors which might be used.

Usually the larger synchronous grinding mill motors operate at low speed, from 150 to 225 r.p.m., and are direct connected to the pinion shaft of the mill. High-speed synchronous motors have been used coupled to the mill through a gear speed reducer and, in certain cases, reduce the first cost; but it must be remembered that an additional piece of equipment is introduced involving extra maintenance and an additional possible cause of breakdown. Also, the introduction of a speed reducer usually increases the total amount of space taken by the equipment.

In this country, where cement plants are supplied by large power systems, the mill motors may be started directly across-the-line on full voltage. Since it is necessary that direct-connected synchronous motors for this service be designed with high starting and pull-in torques, the associated initial current inrush or starting kv.a. may be as high as 675 percent of the normal machine rating. Although large power systems are able to withstand this high inrush, there will be some line voltage drop, and the motors must also have sufficient reserve starting torques so that, under those conditions, there will be enough torque to start the mills.

Grinding mills present one of the toughest drives in a cement plant, and one can readily understand that during winter operation, especially over a weekend or after a shutdown where the equipment is cold and the oil has drained from the mill bearings, if some pressure gun type of initial lubrication is not employed, the starting conditions can be very severe, and it takes motors with high starting torques to insure starting.

Where the power capacity is not large as compared to the motor rating or where the company's power system can not stand the severity of full voltage starting, some other means must be used to reduce the starting kv.a.

Frequently a mill is driven through a magnetic clutch which permits the motor to start without load and at reduced voltage, thereby allowing the starting kv.a. to be kept within a permissible value. Magnetic clutch operation has the added advantage that, during times when the mills are shut down, the motors may float on the line as synchronous condensers for power factor correction. Specially designed motors, which develop high starting torques with low starting kv.a., are sometimes used, but these are expensive and usually require a complicated control.

Although reduced voltage starting will lower the starting kv.a. drawn from the power system, the starting torques are also reduced—and reduced in proportion to the square of the applied voltage. For example if 70 percent of normal voltage is applied to a motor, the starting torque is reduced 50 percent, and under that condition the motor probably would not start. Therefore, the ills of high starting kv.a., associated with full voltage starting of directed-connected motors, cannot be corrected entirely by reduced voltage starting.

(Continued on page 68)

Saves Tires and Gas

Arrow Sand and Gravel Co. builds complete batching plant near war construction to save haulage

By BROR NORDBERG

To the left is Stephen Stepanian, vice-president, who designed plant; to the right, Emery Haines, plant manager

RUBBER and gasoline conservation were the principal reasons why the Arrow Sand and Gravel Co., Columbus, Ohio, constructed a new plant in 1942 to dry batch aggregates and to charge transit-mixing concrete trucks. This plant also is an outlet for crushed stone produced by Marble Cliff Quarries Co., with which the sand and gravel and ready-mixed concrete company is affiliated.

The new plant was located on the eastern side of the city, where there is much war construction, and where the bulk of construction in the immediate future is likely to be. Until the plant was erected, ready-mixed concrete had to be delivered into this active industrial and military area from the company's Franklin ready-mixed concrete plant which is centrally-located in Columbus. The distance between the two is eight miles so the average saving in mileage per truck trip is 16. Cutting off this extra mileage has saved almost 75 percent of truck mixer capacity.

Savings in truck miles when delivering batched aggregates to contractors' concrete mixers are also considerable. Until facilities were made available at the new location, crushed stone had to be hauled by truck a distance of ten miles one way clear through the city from the quarry at Marble Cliff. The round trip took one and one-half hours.

As a typical example, in serving two contractors' pavers, 16 trucks hauled the batched aggregates direct from the quarry to keep each paving machine going. With rail facilities and the new plant, only four trucks are needed for each paver. The saving is 24 trucks. When it is considered that each truck has six tires, 8¼- x 20-in. size, the saving on critical rubber is considerable; about 144 tires of this size. When based on an average gasoline consumption of 5 to 6 miles per gal. and an actual 100 miles traveled daily for each truck, the saving is nearly 400 gal. daily in gasoline.

By re-locating a plant in the midst of active construction centers, such as the Arrow Sand and Gravel Co. did, traffic congestion has been relieved and wear and tear to trucking equipment alleviated, which is the important thing whether the trucks are company-owned or hired on contract.

Wartime restrictions on steel and equipment had an influence on the type of plant built. At the Franklin plant there was a 2000-bbl. Johnson bulk cement bin of steel, in addition to one of smaller capacity. It was decided to convert the big cement bin into a batching bin with four compartments for the new plant, and to leave the smaller cement bin to serve the Franklin plant which is being operated on a smaller scale.

As the bin was of bolted construction, it was knocked down and reassembled in east Columbus. Channels, I-beams and other necessary structural members, along with ele-

Above: New plant for handling batched aggregates and for charging ready mixed concrete trucks moved to center of construction activities to save truck haulage. Below: Close-up of a high-dumper mixer loading at plant. On the right are conveyors from track hoppers which transfer aggregates to bucket elevator

vating and conveying equipment, were taken from other plants of the two companies. An outside welding company erected the plant, which is electric-welded throughout. Stiffeners were electrically welded to supporting members where greater rigidity was needed.

The bin is 20 ft. diameter and almost 40 ft. high. With the batching equipment below the bin and the need for truck clearance, the overall height of the plant was made about 75 ft. Three railroad spurs were built alongside, one track for incoming bulk cement cars, one for stone and gravel aggregates, and one for sand.

Batching Equipment

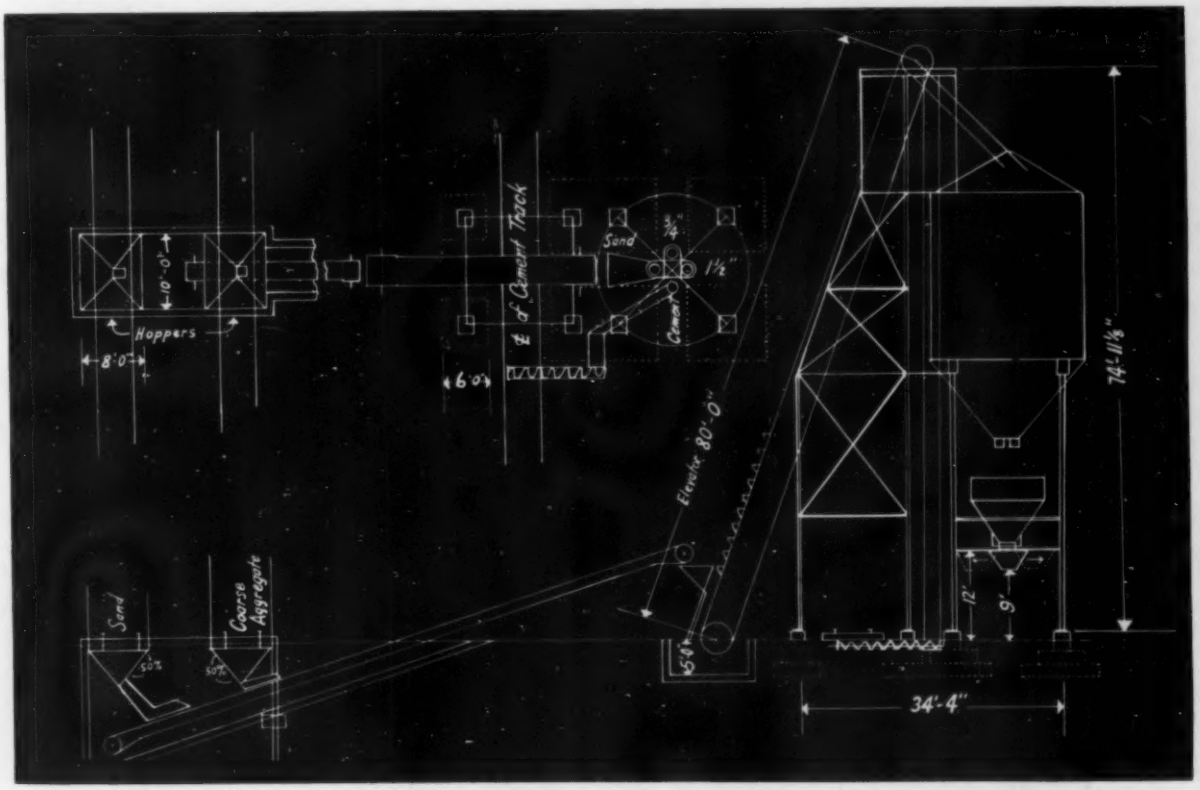
Bulk cement is conveyed by the conventional screw conveyor into an enclosed cement bucket elevator that fills one bin compartment holding 500 bbl. Aggregates, in hopper-bottom cars, are discharged into hoppers underneath both tracks (one for sand the other for coarse aggregates), from which point a belt conveyor and bucket elevator handle materials into their respective bins. Each compartment of the circular bin holds about 100 tons; a total of 300 tons of aggregates and 500 bbl. of cement.

Set-up for batching special cements direct into trucks

Both track hoppers measure 8 x 8 ft. with 50 deg. sloping sides onto a common 24-in. belt conveyor which transfers through a head discharge chute into a 16-in. belt bucket elevator that fills the bins. Capacity of each conveying unit is 150 t.p.h. The belt is on 84-ft. centers, inclined 16 deg., and the elevator turns on 80-ft. centers. Rate of discharge from either hopper onto the belt is adjusted, through remote cable control connected to adjustable hopper gates, and the overhead turn spout is also remotely-controlled to fill the several bin compartments.

Batching equipment consists of a 4-cu. yd. weigh batcher for aggregates and a concentric separate cement weigh batcher built by C. S. Johnson Co. An auxiliary discharge hopper chute is placed under the regular chute (for ready-mixed concrete trucks) as an extension when dry-batching to dump trucks which are lower than mixer trucks. Con-

(Continued on page 70)



Elevation details of concrete batching plant showing location of batching hoppers. Note movable batch hopper.

One Long Kiln From Two Short Kilns

Peerless Cement Corporation installs direct-firing coal mills and integral heat recuperator

AFTER TEN YEARS of inactivity, with the exception of a short period of operation in 1937, the Port Huron, Mich., plant of the Peerless Cement Corp., Detroit, Mich., was placed back into full production in July, 1941. During these years the plant had been maintained in first-class operating condition, always ready to start the fires in the kilns if business conditions warranted.

Housing at stacks where water sprays catch dust out of kiln gases

To start the 1941 operating season, a complete change was made in the kilns. The two original 11-ft. 3-in. x 200-ft. Traylor rotary kilns were joined to make a 400-ft. kiln and the long kiln was equipped with a direct-firing unit coal mill and integral heat recuperator. The single kiln is much more efficient, the plant being wet process, and quick chilling of the clinker has improved the cement and increased finished grinding capacity.

As built in 1923, the plant had a rated capacity of 3000 bbl. of clinker a day. When operations stopped in 1931, it had already been equipped with air separation for finish grinding and the changes in the kilns and firing made the plant entirely up-to-date and efficient throughout.

The two kilns were housed in a building and each exhausted to a separate 155-ft. concrete stack at 1200 to 1300 deg. F. They were fired by coal from a centralized grinding plant by separate blowers, with a coal consumption of 115- to 125-lb. per bbl. Combustion air was not preheated. Each was driven by a 100-hp. electric motor and variable-speed drive. Clinker was elevated into storage by a pan conveyor and the only cooling it received was by water sprays and air cooling in storage.

Join Two Kilns by Welding

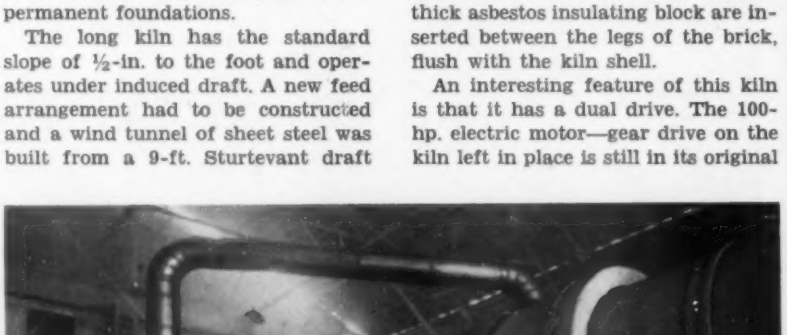
In converting to a single kiln plant, the one 200-ft. kiln was left on its foundations with its drive in the original position. The second kiln was joined to it and the converted kiln extends outside the kiln building beyond the stacks, which remain in their original location. An A-frame hoist and temporary foundations were the means of placing the kiln extension and holding the shell in place while riveting the two together with a 48-in. butt strap and placing the permanent foundations.

The long kiln has the standard slope of ½-in. to the foot and operates under induced draft. A new feed arrangement had to be constructed and a wind tunnel of sheet steel was built from a 9-ft. Sturtevant draft fan to connect to the stacks. There is a common breeching at the two stacks so that the exhaust gases will normally split into both stacks. Inside the breeching, water sprays clean the gases and the dust is run off to waste as a sludge.

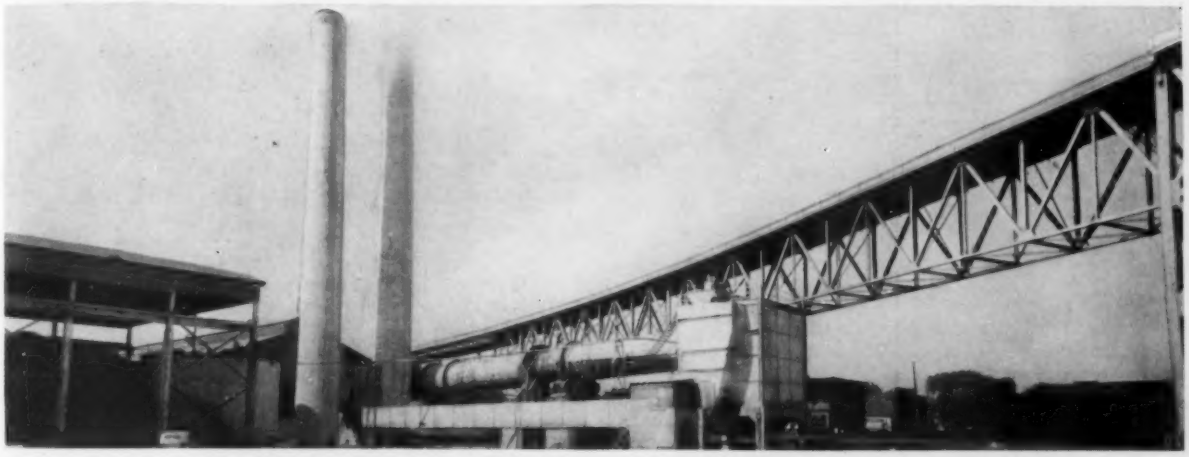
Feed material is pumped from the blending tanks into a tank at the high end of the kiln and a conventional type Ferris wheel feeder puts the raw material into the kiln feed chute. The feeder is chain-driven from off the kiln and has a float switch to automatically control the rate of feed into the kiln.

Slurry as it enters the kiln contains 32 percent water—the same percentage as before—but the new kiln is equipped with heat exchanger chains. The kiln is lined with General Refractories insulating magnesite block in the hot zone. This brick is of special design, with 1½-in. length legs making contact with the kiln shell. Johns-Manville 1½-in. thick asbestos insulating block are inserted between the legs of the brick, flush with the kiln shell.

An interesting feature of this kiln is that it has a dual drive. The 100-hp. electric motor—gear drive on the kiln left in place is still in its original



Direct-fired coal mill and integral recuperator. Two blowers are located under the kiln



Single 400-ft. kiln made from two 200-ft. kilns. Ferris wheel feeder is within housing to the right

location. The identical drive from the second short kiln has been mounted in the same position it had with respect to its kiln. Both drives are variable speed and are hooked up electrically so that when one is started up or stopped the second drive will also start or stop. Similarly, a change in speed of one will automatically vary the other. Power consumption at one revolution every two minutes is actually 150-hp.

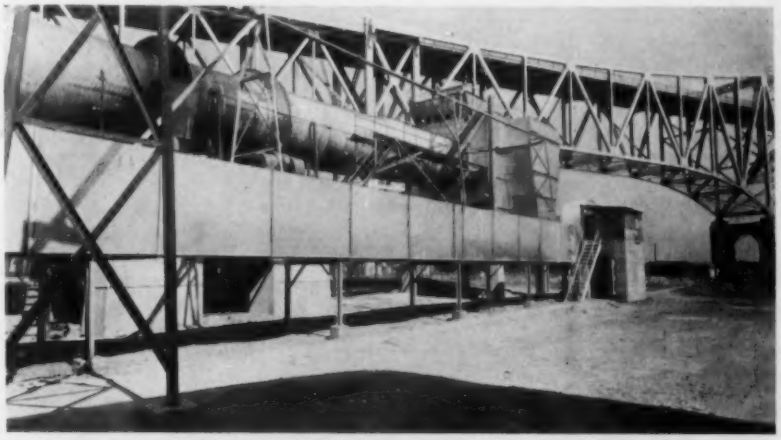
Change to Direct Fired Mills

The kiln is now direct-fired by a No. 452 Raymond bowl mill and has been fitted with the improved and simplified Vanderwerp recuperator. Primary air for drying the coal and injecting it into the kiln comes direct from the kiln hood. The coal-air mixture enters the kiln burner pipe at 170 deg. F. with a fineness of 80 percent through 200-mesh. In one respect the coal handling arrangement is different than that used in other plants. The existing coal feed bin was located some distance from the firing floor and a belt conveyor was installed to feed coal from the bin into the unit mill. The belt is automatically stopped and started up by a rheostat in the electrical circuit to adjust the rate of feed into the mill. Coal preparation power requirements are 16¼ kw. per ton of coal.

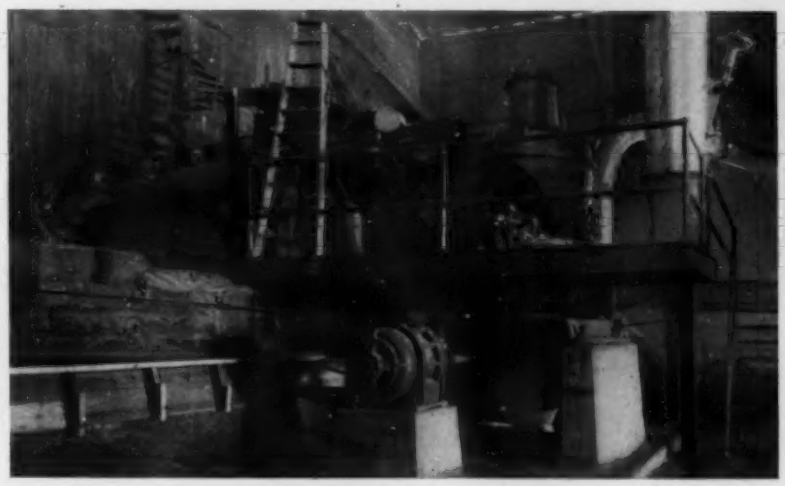
An estimated 20,000 to 24,000 c.f.m. of the secondary combustion air enters the kiln preheated through the recuperator—the rest being drawn from around the kiln hood. The draft is held at 0.2 to 0.3 in. at the kiln draft fan. Clinker is burned at 2700 deg. F. and discharges on to the original pan conveyor at 800 to 1000 deg.

From the standpoint of quality, the installation of coal grinding equipment that has accurate control features and a quick-quenching clinker cooler is producing a more uniform cement clinker and one that is much

(Continued on page 70)



Looking at feed end of 400-ft. kiln. Note long wind tunnel back to existing stacks (not shown) and induction fan below feeder mechanism



Short belt conveyor to direct-firing bowl mill conveys coal from the bins to the mill

Control and Collection of Industrial Dust

PART 4—Cloth Collectors

By E. D. POWERS*

THE TWO CLOTH COLLECTORS in most general use are the stocking or bag and the panel types, both of which are used extensively in industrial plants. They are positive filters in that only the very finest dust particles can pass through the cloth.

This is a particularly important consideration when the dust laden air is drawn from a heated building. The warm clean air from the cloth filter can be returned to the building with consequent fuel savings provided the dust is not a silicosis hazard, for while the dust collection in the cloth filter is very high, usually above 99 percent, the very finest particles which escape through the cloth are the most serious silicosis hazard.

It has been rather definitely determined that particles up to 5 microns are the most harmful to the health and a portion of the dust up to 3 microns in size will pass through the ordinary cloth filter, particularly when it is being shaken.

* Chief engineer, Welland Chemical Works, Ltd., Niagara Falls, Ont.

Where it is practicable to recirculate the air from the discharge side of the cloth filter into the building, the fuel saving can be an important factor. If the average out-door winter temperature is below 40 deg. F. and the temperature within the building 65 deg. F. the saving can be any where from 3 to 9 tons of coal per 1,000 c.f.m. of air recirculated per season, depending upon how many hours of the day the system is in operation.

The panel design (see Fig. 18) is the least expensive and occupies less space. It has limitations however, for if the dust to be collected is greasy, tacky or in some cases chalky, there is a possibility that the built-up dust cake will not be dislodged by the rapping or shaking device. This was found to be the case with one panel type unit handling a very fine dry powder which could not be classified as tacky; but even with one minute shaking, the dust cake when scraped off resembled compressed talc. This unit was replaced by high efficiency cyclones which operated satisfactorily. Fig. 19 shows the panel collector with the cyclones in the background. Bag type filters would handle this dust quite as successfully as the cyclones since the shaking operation snaps the cloth, releasing the dust without difficulty. The cyclones were chosen as the collection efficiency tested sufficiently high and the cost was less than bag filters.

Fig. 19: Panel type cloth filter unit of 15,000 c.f.m. capacity replaced by high efficiency cyclones as the dust was of a "tacky" consistency

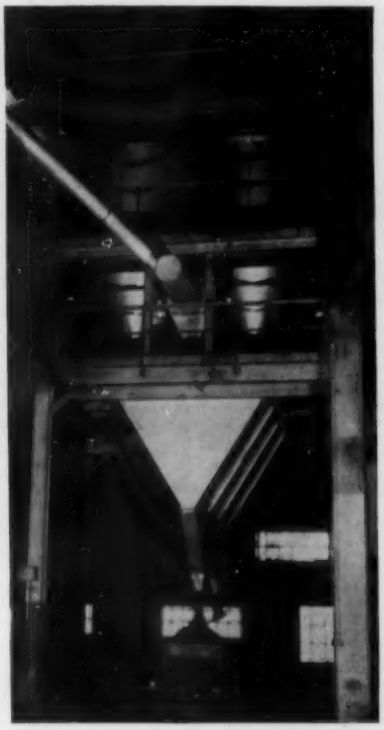
Stocking Type

The bag or stocking type collector shown in Fig. 20 is usually made up of about 12 bags in a cylindrical sheet metal housing. In some cases a great number of bags are contained in a single rectangular casing, but that design makes replacement of a single interior bag difficult.

Cotton cloth is ordinarily used for the filters because of cost, but manufacturers recommend that cotton not be used if the temperature exceeds 170 deg. F. Wool, which costs somewhat over twice as much, can be used up to about 220 deg. F. Asbestos cloth has been used up to about 450 deg. F., but generally speaking, has not been found to be satisfactory. Limitations in mechanical strength make for short life, the fibers are coarse and the openings larger than is the case with cotton and wool. Glass fiber fabrics have also been used for various special applications particularly for high temperatures and acid fume conditions. Their use however is not general and only a few companies are experimenting to determine their limitations. Most glass fabrics will not stand the flexing which occurs when the vibrating mechanism is in operation.

Wood frames are often used for the panel filters but steel frames are much more satisfactory. The largest maintenance cost is replacement of the bags or panels. The life varies, and it is well to investigate the possible effects of both the gas and dust on the cloth when considering filters. Very sharp particles sometimes cut

Above, Fig. 21: Bag type cloth filters, the dust being returned direct to the processing system by screw conveyor



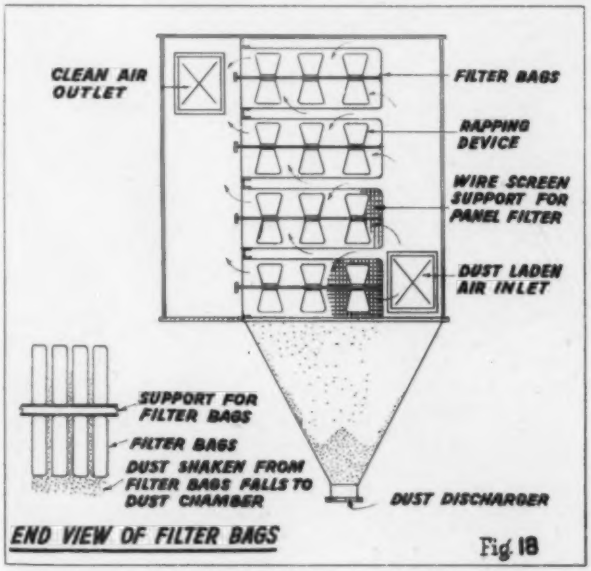
Right, Fig. 22: Bag type cloth filters. In this case dust is accumulated in storage bins and is drawn off in buggies

the fabric and some chemicals dehydrate the fibers while others rot the cloth. In several installations we have found that the life of the bags varies from one to five years.

The shaking mechanism, which in some cases appears rather complicated, will usually be found to give long service without trouble. A timing device, ordinarily included in the bag filter installation, is designed to shake the units in sequence, a valve or gate cuts a portion of the bags out of operation during the shaking period.

The capacity of filter cloth depends somewhat upon the dust burden and the type of dust to be collected. Systems are usually designed on a basis of two or three cubic feet of air per minute per square foot of cloth surface but this ratio varies from 1:1 to 5:1. The latter is not often used as the resistance is too great with consequent high power cost.

The panel type cloth collector is best for filtering air into such service buildings in an industrial plant as offices, laboratories, transformer houses and control rooms where the dust burden is usually low but clean air is required. They are also used extensively in foundries and sand blasting operations where the nature



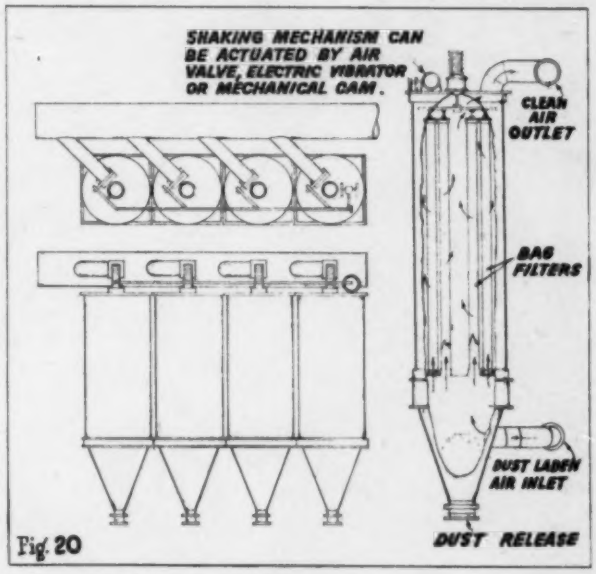

SHAKING MECHANISM CAN BE ACTUATED BY AIR VALVE, ELECTRIC VIBRATOR OR MECHANICAL CAM.
CLEAN AIR OUTLET
BAG FILTERS
DUST LADEN AIR INLET
DUST RELEASE
Fig. 20

Fig. 18: Panel type cloth filter. Fig. 20: Bag or stocking type cloth filter

of the dust is such that it is readily shaken from the cloth.

Fig. 21 shows a very successful bag type filter installation. It is made up of 10 units having the following characteristics:

Total air handled	11,800 c.f.m.
Temperature of air	Atmospheric
Resistance through collectors	4½ w.g.
Total power required for system	25 hp.
Power required for collectors only	14 hp.
The air and dust are dry	
Dust collected	3000 lb. per hour
Dust lost	practically none

The sieve test of the dust collected is as follows:

—20-mesh	0.10 percent
—48-mesh	0.13 percent
—100-mesh	0.78 percent
—200-mesh	1.33 percent
—300-mesh	3.66 percent
—300-mesh	94.00 percent

It will be noted that in the installation shown in Fig. 21 that the dust is removed from the collectors by a screw conveyor which forms the bottom seal. Material is returned by this conveyor direct to the processing system without further handling. Fig. 22 shows a bag type system handling coke dust. In this case the dust is accumulated in the storage vent and drawn off into dust buggies —the bin forming the seal.

When the dust burden is very heavy, cyclones are sometimes used ahead of the filters although it is usually easier to have a classifier built into the inlet side of the collector to precipitate some of the dust and lighten the dust burden. If the air from the filters is returned to the building, and the very fine dust remaining in the building is a serious silicosis hazard, wet scrubbers are occasionally used after the cloth filters.

Where linty materials are handled or cloth collectors are installed in connection with grinding operations, spark arresters are installed at the inlet of the collectors.

Advantages of cloth filters:

(1) Almost complete recovery of dust.
(2) The air volume may be altered without changing the collection efficiency of the collectors.
(3) If the air from the system can be returned to the heated building, the fuel savings may be considerable.

The disadvantages:

(1) High initial cost.
(2) High power requirements. The suction pull is from 2 in. to 5 in. w.g.
(3) Cannot generally be used to advantage with high temperature or moisture.

General Application

Cloth filters are generally used when a high collection efficiency is required of a fine dry- non-tacky dust, which it is desirable to recover in a dry state. They are more expensive than cyclones and less expensive than electrostatic precipitators. They are competitive with wet scrubbers but no general statement can be made of the relative costs as the condition of each job determines the selection.

Motor Characteristics

(Continued from page 61)

Because continuous operation without interruption is essential for kiln service, it is important that kiln drives be given careful consideration. The motors for this service should have good speed regulation and be of the varying speed type. Because kilns and their motors are installed at an incline, anti-friction bearings should always be used so that the ball bearing can take the thrust caused by the inclined mounting. The high temperatures surrounding a kiln dictates the use of motors that run cool, and to insure continuous operation the motors should be of the protected type. Tapered rated direct-current motors are ideally suited for constant torque drives, such as kilns, and are therefore used a great deal. Wound rotor induction motors are also used, but they have the disadvantage of poor speed regulation. Multi-speed squirrel cage motors, sometimes applied, drive at constant speed regardless of load but have only three or four operating speeds available.

Crusher Motors

Crushers, because of high starting torque requirements and variable load operations, are usually driven by wound rotor induction motors. These motors may be of the open type, but it is desirable to have the slip rings enclosed in order to prevent the accumulation of dust and dirt around that vital and exposed part.

Screens and Hammermills

Vibrating screens are usually driven by totally enclosed fan cooled squirrel cage induction motors of the high starting torque type. Because of the great amount of dust surrounding a vibrating screen, it is important that these motors be totally enclosed. Hammer mills are usually driven by high starting torque squirrel cage induction motors or by wound rotor induction motors, and these motors generally are of the open type, since the operation of a hammermill is enclosed.

Final Analysis

No fixed set of circumstances, may be applied to the design and operation of more than one cement plant since each plant has its individual characteristics which the plant engineer must take into consideration. The selection of electrical apparatus to fit the requisites in each case should be based upon engineering analyses made in reference to the special conditions pertaining to each.

Recognition of the unique problems arising from cement plant operation and the realization that these problems must be taken into account are points that the electrical engineer must recognize when called upon to collaborate with the cement plant designer.

An important requisite toward efficiency in making appropriate recommendations for electrical apparatus, therefore, is a general knowledge of local conditions and the problems and technique employed in the manufacture of portland cement.

The Army Can't Wait

(Continued from page 57)

on the car unloader, which connects the drum with the scoop, was originally non-preformed, and had a short life span due principally to the abrasive conditions under which it operates. Another factor which cut its career short was that of bending fatigue; the cable operated back and forth over 6-in. sheaves with the result that wires broke prematurely. Installation of preformed wire rope corrected both conditions. Three-eighths inch Lang Lay preformed was used.

With all difficulties ironed out, Henry J. Kaiser Co. put the plant to work. In operation, they have found it capable of batching and loading a truck in just three minutes, although of course this rate could not be sustained for a long period due to limitations of aggregate storage capacity. However, they have been able to batch between 550 and 600 cu. yd. of concrete in a working day of 11½ hours.

Bulldozer For Short Hauls

Graham Bros., Rancho, Calif., plant uses bulldozer to bring material to main plant conveyor

By FLOYD SUTER BIXBY

IN THE HEART of the San Fernando gravel deposit just 15 miles northwest of Los Angeles, Calif., Graham Brothers' Rancho plant is demonstrating how modern machines and up to date methods can boost production to war time levels. By using the bulldozer system from raw supply to the feeder trap and installing a teletype transmitter and receiver in the dispatcher's office, the plant is now producing 60,000 tons per month working two 8-hour shifts per day.

Over a period of 15 years Graham Brothers, Inc., Los Angeles, Calif., has excavated the 15-acre Rancho tract until now an 180-ft pit hides much of the initial plant activity from casual view. Raw material, dug from the bottom of the pit, must be routed to a long main conveyor leading up the steep incline to the main washing and screening plant.

A few years ago, officials of the company decided that the depth and limited area of the pit was ideally suited to the use of tractor mounted bulldozers for moving raw material to the feeder trap. One model D-8 Caterpillar mounted LeTourneau bulldozer, or an International TD-18 mounted Bucyrus-Erie blade has replaced the old steam dragline in the pit.

As the schedule now stands, bulldozer distances are kept within 300 ft. between the raw supply and the feeder trap by digging access tunnels and installing auxiliary feeders and motor-driven belt conveyors where they are needed. In general, tunnels are placed 25 ft. below the lowest point in a course, and thousands of tons of raw material are handled before the excavation ever reaches down to the man-made tubes. Feeder bins are installed at working level and go down to the conveyor through a hole usually dug by a truck mounted clamshell.

Tractors, which use not more than four gallons of low cost fuel per running hour, push raw material to the trap, where it drops through to a 30-in. conveyor. The feeder is usually on a separate conveyor section, which terminates at the main hoisting conveyor intake in the center of the gravel pit.

Raw material travels next up the main conveyor to the plant up above the pit. There it is chuted to a Traylor primary crusher, set for 4-in. clearance. Throughs from the crusher go to a surge pile and then are routed over a 2½-in. mesh scalper screen to remove the dry sand.

All of the material retained on the scalper screen is passed to a Link-Belt vibrating screen, set from 2½-in. to 1¼-in. Oversize goes to a secondary jaw crusher, set at 1-in. clearance. A Symons adjustable crusher finishes the rock to size. Dumped on elevators, the rock goes to trommel screens to rejoin the dry fines which came off the scalper. The Link-Belt and Stephens-Adamson trommels grade the material to different sizes and

Showing tractor equipped with bulldozer pushing raw material to a feeder trap over tunnel conveyor. The conveyor which inclines up to the plant may be seen, to the left, emerging from tunnel

drop it to conveyors leading to storage. Sand is bypassed through a washer before being routed to storage.

The tractors have served their purpose excellently. Major repairs on all three machines were reduced simply by giving them regular on-the-job care. Control breakdowns due to the failure of wire rope on the winch operated bulldozers were almost entirely eliminated when the company began using preformed rope exclusively on this function. A 6x19 IWRC preformed improved plow steel line is used on the bulldozers and also on the clam closing line of the older crane, where drum crushing is severe.

Teletype Speeds Loading

Graham Brothers have also installed teletype service at the main office downtown and all their plants. When a loaded truck appears at the head of the egress ramp, the weighmaster taps out an identifying code on the bill of lading in the teletype machine. Fifteen miles away a central operator fills in the name of the job, the contractor, the mix number, the rock sizes, the name of the plant and the driver's name from that code. All the dispatcher has to do is tap out the weight and the ticket is complete. Everything in between is handled by remote control while the dispatcher weighs the truck. There is no time lost, and valuable truck time normally wasted in waiting for a waybill to be completed is saved.

At the top of each waybill is a blank piece of paper perhaps 3-in. wide. Inter-office messages can be teletyped from the yard to the Los Angeles office faster than a telephone call can be placed, with no expense involved. Beyond all doubt the teletype system has proved fast, efficient, and in line with the nation's war program of keeping all machines at work.

Two Kilns Become One

(Continued from page 65)

easier to grind. Expansion as measured by the autoclave has also been reduced.

The combination of great length of kiln and preheated combustion air has cut the coal consumption about 40 lb. per barrel of clinker. Temperature of the exhaust gases at the draft fan is down to 375 or 400 deg. F. from as high as 1300 deg. F. with the shorter kilns. Capacity of the plant is now about 80 percent of the production with two kilns.

The rest of the plant has been unchanged. Stone is delivered to the plant in lake steamers from Rogers City, Mich., just as stone is delivered to the company's Detroit plant. It is stocked under covered storage by an overhead power crane, ready for grinding. Slurry is ground in two compartment mills and cement is ground through three 7- x 26-ft. three-compartment mills closed-circuited with two 14-ft. Sturtevant mechanical air separators. The mills are charged with 4-, 2½- and ¾-in. grinding balls in the separate compartments, and the separator rejects return into the mills with the fresh feed.

Construction work on the kiln began in February and production started in July. W. L. Kaiser, vice-president in charge of production, of the Peerless Cement Corp., supervised the program. L. A. Anderson is superintendent at Port Huron.

Reclaim Clay from Gravel

(Continued from page 54)

running it through the proper size screen. Rejects are dropped directly on the main plant belt.

The aggregate and sand bunkers each hold 200 tons. Aggregates and sand are reclaimed on a 30-in. belt running in a concrete underground tunnel, and transported up an inclined trestle to an overhead track hopper. Here they are washed again in a rotary scrubber, run over dewatering screens, and dumped into railroad cars. An oscillating chute is provided to prevent segregation for occasions when concrete mixes are being discharged.

American Rubber Co. belting is used on about 95 percent of the system, and the remainder of the belt is Goodyear. Idlers are the product of a number of different manufacturers.

The method of handling the water is interesting. A Kimball-Krogh four-stage, 2000-g.p.m. turbine pump takes water from the excavation pit in a 14-in. pipeline to the primary plant. From this point, it is taken to the screens and washers in a 10-in. line.

The company ships out a considerable quantity of aggregates in the early morning and late in the afternoon, periods when the plant is not operating. In order to supply water for the final scrubbing operation, it was necessary to operate the entire pumping system—obviously an uneconomical method.

So J. S. Silva, the plant superintendent, devised a secondary system to meet this condition. A small water-supply pool was excavated near the plant, and during the day it is filled from the 14-in. line. Then, when the main pump is shut off, a 3-in. pump is put into operation, and it supplies sufficient water for the final washing.

In the waste water system are two distinct reclamation set-ups. First, the water is run through a Link-Belt classifier, which reclaims the sand content. The latter is transferred by belt back to the screw dewatering classifier.

From this point, the water is taken to the first of four settling ponds. In the first is precipitated the red clay, which is collected and sold. After a substantial amount has collected, it is removed by clamshell bucket and deposited in cars and shipped to refractory plants in the northern California area.

The four settling ponds connect with the shovel pit, and the flow is by gravity from one to the other. The company has built a pea gravel berm between the third and fourth ponds to filter the water.

Save Haulage

(Continued from page 63)

crete is delivered, transit-mixed, in a fleet of T. L. Smith and Jaeger high-dump truck mixers hauled on White chasses. Capacities are 2½- and 3-cu. yd.

By converting a cement bin into a complete batching plant, no provision could be made for special cements in the plant proper. A warehouse for special cements was built near the plant and a charging tipple was erected as shown in the illustration. Special cements are emptied from their sacks into a hopper and the inclined screw conveyor carries them to a spout for direct dumping into mixer drums.

STEPHEN STEPANIAN, vice-president of the Arrow Sand and Gravel Co., designed and erected the plant. EMERY HAINES is manager of the plant. Mr. Haines has had 15 years' experience in concrete design, plant operation and in the merchandising of concrete. He was formerly associated with the Mixed Concrete Corp., and earlier with Permanent Concrete Products Co., both of Columbus.

Cement Production Record

PERMANENTE CORPORATION, Permanente, Calif., reported a production of 5,066,060 bbl. of cement for 1942 as against 3,642,350 bbl. in 1941. A. J. Anderson, plant superintendent, announced that the plant operated 357 consecutive days averaging 100.4 percent of capacity. Permanente production for 1942 represented approximately 21 percent of the total California production.

World's Deepest and Biggest Limestone Mine

Other Matters of Interest to Rock Products' Readers Discussed at A.I.M.M.E. Meeting

By WALTER B. LENHART

UNDOUBTEDLY the subject of most general interest to ROCK PRODUCTS readers on the program of the annual meeting of the American Institute of Mining and Metallurgical Engineers, New York City, February 15-18, was a progress report on the development of the world's largest and deepest underground limestone mine.

The paper by G. A. Morrison, Pittsburgh Plate Glass Co., on "Mining a Deep Limestone Deposit in Ohio" was delivered at two different sessions, at the session on Industrial Minerals and at the session devoted to Mining Methods, thus giving an idea of the wide interest displayed in the subject matter. Mr. Morrison described the surface and underground operations of the company's new limestone mine at Barberton, Ohio. This limestone mine will go into production about May 1, and is the deepest limestone operation in the world. There are two shafts, each over 2300 ft. deep. One shaft will be used for hoisting limestone and the other will be used for delivering supplies, men, and for ventilation purposes.

The shaft is designed to handle 300 tons of limestone per hour which will be mined using the room and pillar system. The high calcium limestone will first be opened up with entries 28 ft. high and 25 ft. wide, that will later be opened to a height of about 50 ft. with a 40-ft. width. A 1½-cu. yd. electric shovel will be used for the entries and a 2½-cu. yd. electric shovel will be used for the rooms. Drilling will be by tripods at first with possible use of wagon drills for later work, although the details of the exact method of mining have not been fully decided on as yet. Mr. Morrison discussed several possible methods of attacking the problem of mining limestone for such high backs.

The stone will be crushed underground in a 48- x 60-in. jaw crusher, so that minus 7-in. stone will be hoisted. The limestone will be screened to insure all is minus 7-in., and the oversize will be returned to the underground crushing plant. The crushed stone will pass to skip pockets that will automatically load each skip.

Another unusual feature of the operation will be the use of Diesel motor trucks underground. Ventilation is amply cared for by fans, which, along with the natural ventilation provided by the two shafts and the high entry ways and rooms, is expected to give no trouble from exhaust gases.

The hoisted rock will be separated into two kiln sizes (plus 4-in., minus 7-in.) that will be burned in vertical kilns, and a smaller kiln stone (plus 1½-in., minus 4-in.) that will go to other lime kilns for burning. The minus 1½-in. will be separated into six sizes and will be ground stored using the Kern system of storing, blending and reclaiming.

The mine will be practically dry (2 gal. of water per minute) as indicated at present. It is expected to mine out about 10 acres per year, which will make a 75 percent recovery, the other 25 percent being left to support the roof. Lantern slides of pictures taken underground showed a remarkable parting plane both for the floor and the backs of the rooms excavated.

Paralleling this paper was a second by Mr. Morrison and J. Murry Riddell, manager, mining division, E. J. Longyear Co., on "Shaft Sinking Operations." This paper, delivered by Mr. Riddell, described the formation, gas and water conditions and practices followed in sinking the shaft. An unusual feature was the use of a newly developed clam-shell type rig for mucking in the shaft. The use of this mucking machine increased the rate per hour per man (active time) about five-fold over hand mucking, and it improved other phases of the operation such as loading, drilling, timbering, etc., as the men were not physically exhausted from the arduous hand shoveling, and were therefore more fit to tackle the other jobs.

All Out for War

The technical sessions were so well attended that some of the meeting rooms almost had to hang out the "standing room only" sign—that is, after the first day, Monday. On Monday, February 15, the New England and New York state areas experienced one of the coldest days in many years and all early morning trains arriving in New York City were delayed from 5 to 14 hours, so that many engineers (including the writer) who expected to arrive early Monday morning, and in time for the Monday sessions, did not register until the following day. This was especially unfortunate as the first day's sessions were devoted to subjects of considerable interest to the rock products and non-metallic industries. However, the papers that were presented will later be available in printed form and any reader interested can secure copies through the offices of the American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York.

It was particularly noticeable to this writer that mining men were interested in the many subjects discussed, regardless of the particular field that the discussions covered, as, for instance, the notable number of strictly mining engineers present at such discussions as were found in the symposium of secondary metals and the several phases of scrap metals. This interest all projects itself back to that all important subject of winning the war. That theme was uppermost in the minds of all, and its presence could be detected, interwoven throughout all the various sessions. This wide interest and good attendance at the technical sessions justified the inconveniences of travel, as all realized that during these times the dissemination of technical information, quickly and clearly, is a step in the right direction towards winning the war.

So many papers were presented at the technical sessions, that in many cases, only sketchy outlines were

given by the author (or his representative) and discussions had to be curtailed somewhat for lack of time. This was a good fault, if it can be called such, because the reviews were sufficient to give listeners an idea of what the subject matter covered and further, detailed information could be gleaned by a later perusal of the printed papers.

Grinding Theory and Practice

The paper by Fred C. Bond and Walter L. Maxson, "Standard Grindability Tests and Calculations" should carry the stamp of authority as it was written by Mr. Bond, who is head of the Process Development Laboratory, Allis-Chalmers Manufacturing Co., and Mr. Maxson, manager, Crushing Cement and Mining Machinery Department of the same company.

These same authors presented a similar paper in 1938, and the present paper brings the subject up to date with tabulated results of 374 standard ball mill grindability tests and 85 standard rod mill grindability tests. The tests were conducted at the mesh size to which the various ores were to be ground in practice; and capacities for a given ball mill can be calculated by comparing the grindability with that of a similar standard ore. This paper (Technical Publication No. 1579) is well worth considerable study by all operators interested in grinding.

The paper by Lawrence Griffith, Research Department, Hudson Bay Mining and Smelting Co., Ltd., on "Theory of the Size Distribution of Particles in a Comminuted System" is also of interest to those grinding ores to the finer meshes.

Technical Publication No. 1577, by Warren L. Howe, consulting engineer, on the subject of "Ball Mill Liners" dealt with investigations of ball mill liner wear and covers a wide variety of liner designs for both primary and secondary ball milling. The comparative results of liner wear tests are presented as evidence to which the extent that design of a liner will influence its life. Slippage was found to be a major cause of ball mill liner wear and loss of grinding capacity as well. A double step liner was developed that reduced liner consumption by 45 percent and in one operation saved 28 tons of manganese-steel liners per year in three ball mills. The figures supplied by the paper's author are enough to make entire paper valuable to all fine grinding operators.

Separation Methods

Technical Publication No. 1576 is a paper on "The Mechanism of Jigging," by Arthur F. Taggert, professor of Mineral Dressing, School of Mines, Columbia University. It presents a theory of jigging operations.

The paper captioned, "Mining, Milling and Smelting in the Tri-State District," by George M. Fowler, R. E. Illidge, and B. M. O'Harra, Eagle-Picher Mining and Smelting Co., is of interest mainly because it describes briefly the "Sink and Float" process in use at one of the company's operations. Later we will discuss this same subject as a half-day session was devoted to this relatively new process.

Industrial Minerals

At a joint session with the Society of Economic Geologists, there were two papers relating to the mica industry (Three were scheduled but the one on "Mica in Georgia" was not presented). The first paper by B. C. Burgess, Carolina Pyrophyllite Co., was on "Mica Mining and Preparation Costs."

The second paper by David Keppel, Colonial Mica Corporation, on the "Mica Bearing Pegmatities of North Carolina," mentioned the lack of subsidiary or associating minerals in the deposits of that area.

A paper by R. E. Van Alstine of the U. S. Geological Survey, on "Fluorspar Deposits of St. Lawrence, New Foundland" pointed out the importance of developing quickly more fluorspar for war needs. Its use in the aluminum industry and as a source of fluorine salts make it of prime importance to develop a far greater tonnage of fluorspar, and the deposits covered in the paper are of considerable magnitude and will help solve the shortage problem.

A paper by Major H. D. Keiser, Services of Supply, War Department, "Use of Fibrous Glass by the Army and Navy," outlined many new uses of that product as developed in the plant of the Corning Glass Works.

Oliver Bowles, U. S. Bureau of Mines gave a paper, "War Has Stimulated Domestic Output of Most nonmetallic Minerals."

Flotation Practices

An afternoon session was devoted to the subject of flotation with five papers. All of the papers were highly technical and more of academic interest to advanced physicists and flotation hair-splitters than to the commercial operators.

A second half-day session was devoted to Milling Methods. A paper by Warren E. Wilson, professor of mechanics, Colorado School of Mines on "Launder Designs" was a mathematical discussion of the factors entering into the design of launders. The author gave a workable method to make possible a fairly accurate method of designing launders. A paper at this session, "Settling Device for Sludge Samples," by A. A. Gustafson, Freeport Sulphur Co., described a simple and efficient device for sampling diamond-drill sludges, or for sampling cuttings from churn-drill (bailing) operations.

A paper, "Sticky-Surface Concentration of Gravel-Size Minerals," by John Dasher, James Norman and O. C. Ralston, all of the U. S. Bureau of Mines, was presented by Dr. Ralston. This paper was brought up to date after having been presented at a regional meeting of the A. I. M. M. E. The paper describes a continuous method of making a separation between some non-metallic minerals due to selective adhesion of filmed particles to sticky, water-repellent surfaces

Possible applications of the process are limited to plus 6-mesh sizes, but possibly could be used for separation of unsound particles in the sand and gravel industry.

Heavy Density Symposium

One session covered a half-day period and included five papers on the subject of "Sink and Float" separation. This process depends upon the use of a heavy density pulp (or liquid) into which plus 2-in. material is passed. The heavier particles sink and the lighter float. At first costly organic compounds were used for the high density media, but now extremely finely divided galena, ground in water, is used in some cases. The galena is so finely ground that it acts as as suspensoid, and the density of the pulp can be maintained well within the limits required. Ferrosilicon, or magnetite, can also be used instead of galena.

The process is essentially an hydraulic sorting process, and in the lead-zinc field has resulted in greatly improved practices and far greater tonnages through the mills with costs as low as 8c per ton of feed material. The process could have many uses in the non-metallic field, since it requires only a small difference in specific gravity of the two (or more) component minerals to be separated.

Of special interest in this sym-

posium was the paper by H. H. Vogel, Manager, Barton Mines Corporation, "Heavy-Media Separation Plant of the Barton Mines Corporation." Mr. Vogel described the use of the "Sink and Float" process at the corporation's garnet plant, North Creek, N. Y. It was found at this plant that garnets, plus ½-in., could be separated perfectly from a hornblend gangue. The specific gravity of the garnet is 3.8 to 4.1 with the hornblend having a gravity of 3.07 to 3.24. On the finer sizes of garnet excellent results could also be obtained when compared to results obtained by old jigging practices. Ground ferrosilicon is used as the heavy-media.

Vermiculite Held to Be Placer Not Lode Mine

IN THE CASE of Black Mica Mines, Inc., vs. W. E. Vernon and Joel F. Swank, defendants, Judge John R. Clark of the District Court of Gunnison County, Colorado, held that vermiculite occurs as a placer rather than a lode mine and should be so classified in making a mining patent claim. Black Mica Mines, Inc., had made its claims as a placer operation and the defendants entered claims as a lode operation. Vermiculite had not been mined on the property until recently, but this mineral has come into more general use as an insulator.

Brazil's Lime Industry

ALTHOUGH the lime industry in Brazil is only 20 years old, there are 385 factories having 530 kilns with a production of 200,000 metric tons. Fifty percent of the production is in the State of Sao Paulo.

Canada Lifts Steel Wage Ceiling and Foresees Trouble

By KENNETH R. WILSON

Ottawa Correspondent of Rock Products

OTTAWA — Canada's entire wage and price stabilization program has been threatened in recent weeks by a settlement made by the Dominion cabinet itself, with 13,500 striking steel workers in Sydney, N. S., and Sault Ste. Marie, Ont.

Wages in Canada's big steel plants have been under discussion for over a year. Last year, provincial wage boards in both Nova Scotia and Ontario refused an increase in basic wage rates on the ground that such an increase was contrary to the government's wage stabilization order under which all Canadian industry has operated since November, 1941. The steel workers were not satisfied, and a Royal Commission was appointed to look into the whole matter. That commission brought in its report early in January, and shortly after, the men went on strike. A majority of the commissioners reported against a wage increase and a minority of one dissented.

Because of the urgent need for steel, the Canadian Prime Minister and his cabinet decided to meet the C.I.O. union representatives personally at Ottawa. Out of these meetings came a settlement which it is believed cuts at the very root of the wage-price ceiling program. How far this settlement has gone towards undermining this program is not yet clear.

The reason this settlement plan is regarded as so disturbing is that it grants to workers at both Sydney and Sault Ste. Marie a new basic wage rate of 55 cents an hour. This is an increase of 11½ cents per hour in the case of the Dominion Iron and Steel and Coal Co. plant at Sydney, and an increase of 9½ cents for workers at the Algoma Steel plant at the Sault.

Under the Canadian wage stabilization program, the men at Dosco were receiving a basic rate of 43½ cents plus a cost of living bonus of 9 cents or a total of 52½ cents per hour. The Algoma workers were receiving a basic wage rate of 45½ cents plus a cost of living bonus of 5 cents, or a total of 50½ cents. The new basic rate is 55 cents for both plants and workers are granted the right to apply for a cost of living bonus over and above the 55 cent rate.

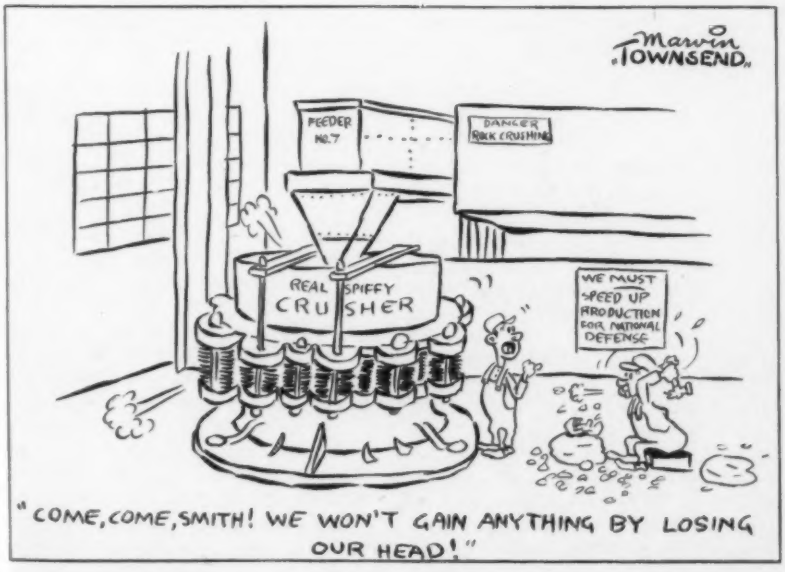
Wage Stabilization Principle Violated

The principle on which the Canadian wage stabilization program had been built and which had been accepted by the bulk of Canadian wage earners up till now is that "basic" wage rates which prevailed as at November, 1941, must not be changed (unless they are found to be out of line with prevailing wages in that trade or community), and that any upward adjustment must be by means of a wage bonus which moves up or down with changes in the cost of living.

No evidence was submitted to the provincial boards, the Royal Commission, or to the Prime Minister to show that wages paid in these plants were out of line with prevailing wages. On the contrary it was indicated that steel workers' wages in these plants were generally high compared with comparable wages in other plants or areas. Therefore the fact that the Prime Minister and his cabinet deliberately overruled the earlier wage policy and raised basic wages even higher than the combined total of the old rate plus the cost-of-living bonus is viewed generally with considerable alarm.

The negotiations for the workers

(Continued on page 102)



"COME, COME, SMITH! WE WON'T GAIN ANYTHING BY LOSING OUR HEAD!"

Controlling Factors for Efficient Rotary Kiln Operation

Selection of refractory lining materials and their proper installation in the kiln

By RALPH GIBBS

MATERIALS other than fuel and kiln feed enter into the general problem of operating the rotary kiln efficiently, and those specific problems concerning the refractory lining of the rotary kiln are subjects of no mean import. The cost of such a lining varies with the size of the kiln and with the type of material of which the lining is composed. When it is realized that a kiln lining costs between $50 and $200 per lineal foot, it will be seen that all reasonable effort to make the lining last as long as possible will be well directed. Cases are on record where a new lining in the firing zone was burned out in less than 24 hours. On the other hand there are cases where the lining in this same zone has operated for periods of a year or more. Some of the factors that enter into the longevity of a kiln lining are listed as follows:

1. Proper composition for use with the material being processed.
2. Properly layed-up in the kiln.
3. Reasonable heating-up period.
4. Avoid overheating.
5. Development of protective coating and maintaining it.
6. Avoid wide temperature fluctuations.
7. Avoid shut-downs as much as possible.

Generally two or more types of lining materials are used for the entire kiln. Frequently there is a highly refractory lining material used in the high temperature zone, a lesser refractory material in the intermediate zone, and a cheaper, still less refractory but high-resistance-to-abrasion material in the coolest zone. This is good practice and can be safely followed.

From the point of view of the users of the refractory lining material, however, the available lining materials are far from being ideal. The following is a list of some of the characteristics of the ideal.

1. Lowest known coefficient of heat conductivity.
2. Absolutely resistant to abrasion.
3. Chemically unreactive at prevailing operating temperatures.
4. Not "wetted" by fused or molten substances.
5. Not fusible at the highest possible kiln temperature.
6. Will not crack or spall.
7. Reasonable first cost.

If such a refractory kiln lining material was available today, the operating man's worries would be considerably lessened for he could anticipate reduced heat losses through the kiln shell, permanence, and no coating or ring troubles.

Types of Refractory Lining Materials

Choice of refractory lining material for the rotary kiln depends largely upon the type of material being processed, together with the temperatures prevailing in the different zones of the operating kiln.

Ceramically there are three common different types of substances, namely basic, neutral and acid. There is also a sub-group which, somewhat in common with the sex-life of the oyster, can change their nature and be either basic or acid, depending upon their companions.

Contrary to the general benefits man realizes from the operation of the biological laws, with refractories best results will be obtained if the practice of keeping like with like is carried out. Thus for processing a basic substance it is well to use a basic lining material especially when operating temperatures are high and possible chemical action might be promoted. On the other hand, neutral substances might be used, and amphoteric materials may be used safely if the temperatures are not excessive.

When an acid substance is being processed the same rule applies.

For most ordinary rotary kiln purposes alumina types are used especially in the zones of higher temperature. When extremely high temperatures are required in processing basic materials, simple or complex magnesitic linings are generally used. In processing a highly acid material, a siliceous lining can be used.

Less refractory lining materials can be used in the cooler sections of the kiln, but such as these should be highly resistant to abrasion and spalling since no protective coating is formed or permanent in these sections.

Installation

The placing or installation of the rotary kiln lining should be performed with reasonable care and strict attention to details, usually supplied willingly by the manufacturers of the lining material.

Would that each man laying kiln blocks forget to bring his "mash" hammer during the course of this work. The manner in which some masons hammer and pound these kiln blocks into place is enough to send the cold chills up and down the spine of one who appreciates how

such blows can cause cracks and fractures in the blocks even before the kiln has been "lit off." Possibly a weighted rubber hammer would suffice. Their liability to fracture the block would not be as great as those miniature sledges.

Many prefer to lay the kiln blocks dry, while others use a moderate amount of thin mortar or high temperature cement. In any event the blocks should be laid up fairly tight.

When spalling due to pinching is observed, it may prove advisable to allow a small joint for expansion. But a lining continually "works" in the kiln shell and in no case should the lining be laid up too loosely, since this will permit abrasion between the loose blocks which will eventually allow a key to fall out. Furthermore, a loose lining in the high temperature zone will not be able to retain its protective coating since the working of the blocks breaks this coating off as fast as it is formed.

Coating

Possibly this subject of coating by now is confusing. In a previous article the subject of heavy coating was discussed. Ordinarily a certain amount of coating is highly desirable. It is only when it gets too heavy that coating becomes really troublesome. But an optimum thickness of coating protects the refractory kiln lining from abrasion and also acts as a heat insulator thus reducing the kiln shell heat loss and shell deterioration.

The development of a good coating on the refractory lining depends a great deal upon the quality of the kiln load material. Excessive quantities of fines, as mentioned before in a previous article, can cause heavy and troublesome coating. Impurities in the feed, overheating, etc., all play their part. On the other hand, when very clean and pure kiln feed is used there may be some difficulty in developing and maintaining a satisfactory coating. Under such conditions it may prove highly beneficial to have an optimum amount of fines in the feed. This optimum quantity can be determined only by trial. Generally between 2 to 10 percent of fines will suffice, depending upon the chemical purity of the raw material.

In most instances the coating adjacent to the refractory lining, through fusion and interpenetration, becomes an integral part of the lining, and conditions that cause this coating to spall or "slough" off will occasion the loss of considerable of the refractory lining at the same time.

No doubt this zone of junction or interfusion of the coating and lining material has entirely different physical and chemical properties than those of the original refractory lining material, so that frequently there is a definite fracture developed at this position. Excessive fluctuations in temperature will cause such fractures to develop.

Lighting-Off the Kiln

Probably the hardest service condition any lining must withstand is that existing during the "lighting-off" and "heating up" period. At this time enormous forces are at work while the cold materials are physically adapting themselves to the changes caused by the rising temperature. These expansive forces are tremendous and unless provision and time are allowed for the inevitable readjustments to take place, serious damage to the kiln lining can be done. There are those who take great pride in the short time they need to get a kiln into production. It is very doubtful that they can take the same amount of pride in their refractory costs. It is during these starting up periods that a lining can be ruined before it has even been put to work.

(To be continued)

Growing War Construction Program—Abroad

AMERICA'S 1943 construction program is swelling to proportions much larger than experts anticipated.

"Top War Production Board officials say it may grow even bigger than the vast 1942 facilities program, despite their efforts to slice it down. They have warned the armed forces of this possibility.

"Published statistical estimates don't tell the real story of what's ahead for this year. Construction (including equipment) in the United States is estimated at $13 billion against $16.5 billion in 1942. But one highly important factor is the 'secret' construction program for war work outside this country. Officials won't even talk in round figures but they do concede that it will be much larger than the $2 billion total for last year.

"What's more, policy makers are convinced that construction in this country will top the estimates of their statisticians."—HENRY GEMMILL, in *Wall Street Journal*.

In its column "Rumors" the same newspaper says:

"Buying of cement stocks, which took Lone Star above 42 into new high ground for 1942-1943, followed Government plans which would mean considerably larger construction this year than had been estimated, and bring the total close to the record of 1942. This, of course, would benefit the cement companies, and buyers of securities have taken note thereof. Pennsylvania-Dixie Cement preferred has been stronger and the company showed net income of $8.76 a preferred share in 1942, on which stock there are $84.75 accruals, compared with $9.26 a share earned in 1941. Financial circles see no immediate promise of any plan to take care of these accruals, although the company is paying preferred dividends, with a recent declaration of 75 cents. Last year a total of $3 was paid. Lone Star Cement showed net income of $3.62 in 1942, compared with $4.33 the previous year, and was generous in its dividends with $3.25 paid in 1942."

Boost Quarry Wages to "Captive" Mine Level

EMPLOYES of the Carbon Limestone Co., Hillsville, Penn., secured another 5½c an hour increase in wages to bring the minimum rate to 78c an hour, the same minimum paid generally in the Youngstown district, under a War Labor Board decision announced recently in Washington, D. C. The new minimum rate conforms with the minimums paid by the two "captive" limestone producers in the Lowellville-Hillsville area, Lake Erie Limestone Co., a Republic Steel Corporation subsidiary, and Pittsburgh Limestone Co., the U. S. Steel Corporation subsidiary. The increase is in excess of the labor board's "little steel" formula, carrying a 15 percent ceiling over January, 1941, levels, but the board's policy does not exclude consideration of inequalities when the 15 percent is reached or exceeded. Carbon Limestone employes already had received increases totaling 22.6 percent over their January, 1941, rates. In opposing the increase, the company cited Ohio limestone wage rates which are 62½ to 65½c an hour.

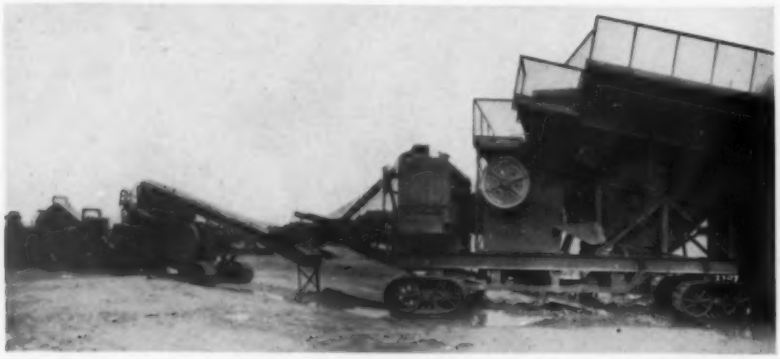
Largest Conveyor Belt

THE B. F. GOODRICH CO. announced that it had received a war order for a conveyor belt 66 miles long, said to be the largest in the rubber industry's history.

NEW EQUIPMENT

Sand and Gravel or Quarry Plant

PIONEER ENGINEERING WORKS, Minneapolis, Minn., has designed and is now building a flexible portable plant which can be used in either a quarry or a gravel pit. It will crush, screen, wash, and produce two or three sizes of finished aggregates. It is said that the plant can reject excess sand or produce "stone sand." For concrete aggregate, it will wash all products, or if washed aggregates are not required, it can be used as a dry plant. Each unit of the plant is mounted on tracks or wheels.



Flexible type portable plant which can be used in either quarry or gravel pit to produce washed or unwashed products

The primary crusher is a 30- x 42-in. overhead eccentric jaw crusher with a welded steel base. Three roll crushers provide ample crushing capacity for any size or requirement.

Electronics

GENERAL ELECTRIC CO., Schenectady, N. Y., has issued a 32-page booklet, entitled "Electronics—A New Science for a New World." This booklet, beautifully illustrated in color, describes the many interesting uses of electronics and points out some of the possibilities which it offers for the future. Manufacturers of heavy steel castings are now using powerful X-ray machines to determine flaws in parts before installation. Perhaps electronics may also determine whether aggregates are unsound before they have been finally processed and shipped to the user.

Welding Rod Conservation

A SIX-POINT PROGRAM for conservation of welding rod was recently outlined by H. O. Westendarp, welding engineer of the General Electric Co., in a talk before the Cleveland section of the American Welding Society.

These six suggestions are as follows:

1. Select largest diameter and greatest length electrode that can be applied successfully. This not only speeds up deposition rates of weld metal, but also results in a decided increase in the tonnage of electrode that can be extruded per day from existing facilities.

2. Joints to be welded must have good fit-up—excessive gaps are prolific wasters of metal.

3. Use proper amperage for the job—avoid excessive currents and long arcs. There is a current beyond which deposition rate is decreased and electrode consumption increased.

4. Don't bend electrodes except where absolutely necessary. Bent electrodes destroy electrode coating and result in excessive stub losses.

5. Produce true fillet welds having equal legs—this is a function of proper type of electrode and welding technique.

6. Use each electrode down to point where full coating diameter ends.

Pneumatic-Tired Lift Truck

WILLAMETTE HYSTER CO., Portland, Ore., has placed on the market its Hyster No. 75 model lift truck. This unit is said to be particularly suitable for operation over comparatively rough terrain as it is equipped with three 7.05 x 15-in. pneumatic tires. The new lift truck should be adaptable to stacking sacked cement and the handling of concrete products or concrete pipe.

It is powered with a 34-hp., 4-cylinder, industrial motor, complete with transmission, and is mounted on a three-point suspension. The hoist operating unit, consisting of fluid pump and valves, is assembled on the oil supply tank, accessible for removal separately or as a unit. The oil pump is driven from the front of the motor by three V-type belts which can be adjusted or replaced with ease.

To facilitate repairing or replacing tire, the specially designed steering mechanism and counterweight has a removable wheel assmbly. All tires and wheels, front and rear, are interchangeable. Removal of the trunnion steering wheel is accomplished by unscrewing one lock bushing which allows the wheel, tire and axle to be removed in one unit.

Easily maneuverable lift truck equipped with pneumatic tired wheels

Electronic-Control Feeding

MAX MOSHER, New York, N. Y., designer and builder of automatic control equipment for pulverizer and grinder feeders, has made some improvements in his control device.

Originally, an electrical control was used which, because of heavy-duty relays, represented a considerable item of cost. More recently he has developed an electronic control means, utilizing electronic tubes and relatively small and inexpensive relays, whereby more precise control is effected at reduced cost.

The electronic control comprises a control unit housed in a steel case and connecting to the magnetic contactor switch of the feeder motor operating the mechanical feeder, which motor in usual installations ranges from 1 to 5 hp. When the control is first installed an ammeter is wired into the circuit and the grinder motor started. When full load is indicated on the ammeter, the load range regulator knob is turned to decrease the load until the red light shows. The control is then set for permanent operation.

How Control Operates

A special current transformer is supplied, adjusted for the normal full load current for the grinder motor. This transformer is the only acessory equipment required in addition to the feeder motor magnetic contactor switch which would normally be used even without automatic control.

In operation, the grinder motor is started in the usual manner. The feeder motor is interlocked with the grinder so that it cannot be started until the latter is in operation. After starting the grinder motor, the feeder motor starts. A white signal light on the control panel flashes on to indicate operation of the control. The load range regulator has a range of from 50 to 125 percent of the grinder motor full load, so that the equipment is quite flexible and can be used for a wide variety of materials. Once the maximum load is set for a material, however, the controller keeps close tab on the limit. If the material changes, or if for any reason the load in the mill rises above full-load setting, the control will cut off the feeder motor automatically, and the red light goes on. The mill will continue to discharge and the load in the mill will drop to below the load point setting, whereupon the feeder cuts in again and the red light goes off. A continuous red light indicates that the grinder is not discharging, which may be caused by too wet material or the plugging of the discharge line. A steady red light for over 30 seconds or so should be investigated by the attendant. A no-load signal or green light goes on when the load in the mill drops about 25 percent below the full-load setting. This indicates that material is not reaching the grinder, and may be due to an empty bin or arching over the mill or feeder.

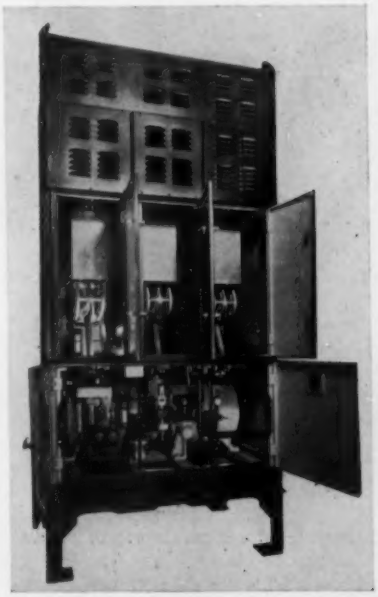
The control panels are built in capacities up to about 250 hp. on the grinder motor and for about 5 hp. on the feeder motor. Standard voltages range from 110 to 550 volts, but equipment can be built for voltages up to 2300 on the main grinding motors. The control proper operates from the usual 110-volt supply.

Automatic control device for crusher and pulverizer feeders

Air Breaker for Dusty Locations

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., East Pittsburgh, Penn., has brought out a compressed air circuit breaker rated at 15 kv., 1,000,000 kv.a. interrupting capacity for operation in plants with dusty atmosphere conditions. Four 4000-amp., 25-cycle, Type 150-CA-1000, breakers as shown, are to be used at 12 kv. on purchased power line and feeder service.

Two similar 1400-amp. breakers have been delivered to the same plant to be used for replacing existing oil breakers as part of a plan to modernize the existing substation. Air breakers were chosen for the job not only because they are considered well suited to the dirty atmospheric conditions, but also to eliminate the fire hazard and maintenance associated with oil.



Air circuit breaker designed for operation in dusty atmosphere

Portable Car Spotter Speeds Freight Movement

LINK-BELT CO., Chicago, has announced that its line of electrical car spotters, heretofore only available for stationary mounting, is now obtainable in portable form.

The spotter is so balanced on a channel iron frame that one man can lift the one end and roll the unit to any desired location. For operation it is only necessary to anchor the frame with a chain, as illustrated, plug the electric cord into the nearest power outlet, hook one end of haulage cable to car or object to be moved and wrap the other end around capstan.

Motorized electric car spotter mounted on wheels may also be used to move trucks and other objects

How to Obtain Accuracy in Sampling

Importance both of proper experiment and of adequate principles as the basis of sound practice

By CHAS. DEMOND*

IN DETERMINING the value of materials passing through any treating establishment—such as a metallurgical plant, a paint factory or a cement plant—there is sometimes a tendency to think that, although chemical analysis requires great accuracy yet the getting of samples for analysis, being a "practical" man's job, does not call for the scientific skill of the laboratory even though it does require some degree of care.

In this connection it is particularly important to emphasize the difference between a specimen and a sample. The former is a portion that contains a noticeable amount of each essential constituent of the mass from which it is taken; but it is intended only as a qualitative representative.

A sample, on the other hand, is a definitely quantitive representative: unless it contains the same proportions of each essential constituent, within specified limits, as there are in the original material, then no skill in chemical analysis will show the true content and value of the original mass within the limits specified. When thus plainly stated, the difference seems entirely clear; but it often happens in practice that it is not clear. The eye cannot distinguish the unlikeness. And in not a few cases where the distinction is theoretically understood, the methods are such that the material taken as a sample is very faulty and misleading.

Each of the two operations—sampling and analysis—has a scientific basis; and each requires practical experience in order to be carried out efficiently. In what follows we shall see that it is no mean task to secure correct samples. Yet correct samples can always be had if proper care is used; and, commercially, they are well worth considerable cost, for several reasons. In the first place, doubt as to the accuracy of a sample makes trouble between buyer and seller, because of uncertainty as to the money value. Also, inaccurate samples upset the balance between input and output of a treatment plant, which causes worry as to where the values have gone. Moreover, in smelting, the exact content of silica, alumina, lime, etc., must be known as well as of the metal, in order to properly flux the furnace charges. In leaching, the exact acidity and other qualities must be known before reagents can be properly proportioned. In either of these treatment methods serious losses occur when this accurate information is lacking. Similar problems occur in cement manufacture, both as to the relative amounts of lime and silica, and as to the fluxing by iron and alumina, and also as to the good or poor quality of the clinker.

*Until his death about a year ago, Mr. Demond had been with the California Portland Cement Co. for many years. He had made the study of sampling a matter of close personal interest.

Some Basic Principles

If the material to be sampled is a mechanical mixture of two separately produced minerals, both having the same specific gravity, each pure and therefore of uniform composition, the quantity needed at any stage of crushing can be determined by the elementary method of trying different weights until an amount is found which gives the required precision when ten or fifteen separate portions are chemically analyzed. Then the required quantity at any other stage of crushing will be such as contains the same total number of particles as occur in the successful samples at the testing stage. It is commonly and with fairly good reason assumed that the relative number of particles per ton at any two stages of crushing is approximately the same as if all the particles were of the maximum size of each stage. For example, it is considered that eight tons of rock at the two-inch stage contain the same number of total particles as one ton at the one-inch stage, since a two-inch lump has the same volume as eight one-inch lumps. Because the weights of different sizes of particles are proportional to the cubes of their diameters (provided they all have the same specific gravity) the required weight at any size, using the kind of material mentioned, is expressed by the equation

$$W = kD^3$$

where W = weight
k = a constant
D = diameter of largest particles.

This formula has sometimes been considered suitable for any material; but with most ores there is a condition not present in the case mentioned: in all but the finer sizes of ore as it comes from the ground, a large proportion of the single pieces contain both valuable mineral and waste. In the first case mentioned a single piece could not possibly be a correct sample of the total mass: it would be 100% of one mineral and 0% of the other. But in the second case it is possible for even a single piece to be a correct sample. Though we cannot pick up any particular lump and say, off-hand, that it is a correct average, yet there are so many pieces that moderately approach the average (some of them richer and some poorer) that a less total quantity will be needed than in the first instance. The chief problem is to determine, for any particular material, the proper quantity to take at each stage of crushing.

Accurate Analysis From One-Gram Sample

Before going into the experimental determination we will first turn to another possible basis of estimate, which helps to clarify the problem. It is well known, from long and wide experience, that when any rock product is ground to pass through a 150-mesh screen (0.0041-inch openings) and is well mixed, careful methods give a high degree of precision in the chemical analysis, with a limiting error of say 0.03% when using a one-gram sample.† At this stage of grinding there is, usually, very little and sometimes no intercrystallization of minerals even in cases where moderately

coarse sizes do show much of that condition. For pure minerals that have no intercrystallization even in the coarse sizes it has already been shown that the proper weights at different sizes are proportional to the cubes of the diameters of the largest particles, provided they all have the same specific gravity. Then, on the basis of one gram being a suitable weight when everything is finer than 150-mesh, the required weight at one inch is sixteen tons. But where there is intercrystallization in the coarser sizes, a much smaller weight is commonly enough.

In some ores, as mined, most of the valuable mineral is coarsely crystallized and irregularly distributed; while in others most of it is finely crystallized and much more evenly distributed. During the coarse and medium stages of crushing, the first of these two kinds yields more of the fine sizes of the valuable mineral than does the second, because this mineral is much exposed to pulverizing in that case. In the second case most of the valuable mineral is so dispersed in the gangue as to escape pulverizing in the early stages. But, as the grinding gets finer and finer there comes to be less and less difference between the two ores as to the degree of segregation; and when the 150-mesh stage is reached, nearly all the valuable mineral in each is completely separated from the gangue, and of about the same range of particle size. To illustrate: if we have two 10% lead ores, one of which carries a good deal of galena in crystals as large as an inch, and much segregated, while the galena in the other is all finer than one-sixteenth inch, and somewhat evenly distributed, the required weight at the one-inch crushing stage is likely to be ten to twenty times as great for the first as for the second ore; but when the 150-mesh stage is reached the proper weight will be close to the same for one as for the other.

Generalizing the formula already quoted, by substituting "a" for "3" as the exponent, we have:

$$W = kD^a$$

This generalization drops the assumption that all particles have the same specific gravity; otherwise it would not be a "generalization," it would exclude the majority of cases.

It is later emphasized that the natural difference just indicated for various raw materials are expressed by the fact that "a" varies from one material to another. Table 1 shows weights at certain crushing sizes corresponding to different values of "a". The weight at 1/256 in. is here assumed to be constant (0.002204 pounds, or 1 gram) by warrant of long experience. The 1.5 for "a" represents rocks that have quite uniform distribution of values throughout the gangue, and which can therefore be accurately sampled by taking only moderate weights at even coarse sizes; while 3.0 represents those that have complete segregation of the valuable mineral from the waste even at the coarse stages, and hence require large quantities at those sizes.

TABLE 1—ILLUSTRATING PRINCIPLES

	Pounds at different sizes				
"a"	1 in.	¼ in.	1/16 in.	1/64 in.	1/256 in.*
1.5	9.03	1.13	0.141	0.0176	0.002204 (1 gr.)
2.0	144	9.03	0.564	0.0353	0.002204 (1 gr.)
2.5	2,310	72.2	2.26	0.0705	0.002204 (1 gr.)
3.0	37,000	576	9.03	0.141	0.002204 (1 gr.)

*1/256-in. is a little finer than 150-mesh; and all weights in this table are somewhat higher than if they were based on one gram at 150-mesh.

To clearly understand the practical value of the sampling equation, we should carefully notice what the significance is of the coefficient "*k*" and of the exponent "a". In setting up standards, any measure may be adopted as the unit of diameter. If an inch is chosen for the unit we see, in Table 1, that when "a" is 2.0 the weight at ¼ in. is $(\frac{1}{4})^2$, or 1/16, of the weight at 1 in; and when "a" is 2.5 the weight at ¼ in. is $(\frac{1}{4})^{2.5}$ or 1/32nd, of the weight at 1 in. But if we choose ¼ in. as the unit of diameter, the weight at 1 in. when "a" is 2.5 is thirty-two times the weight at ¼ in. Carrying this reasoning as far as we wish, we soon see that "*k*" is, in any case, simply the weight at unit diameter.

A caution is in place as to the significance of "a". This caution is given because the points to be presented have been raised in some serious discussions of the subject. In our first mention of 3.0 for the value of "a", reference is made to the fact that the volume of a solid is proportional to the cube of its diameter; but the process of determining the quantity to be taken at different stages of crushing and for different types of material is not a process of *calculating volumes;* it is, primarily, an *experimental* method of determining the *weight* needed at different sizes to guarantee accurate samples. To convert volume to weight requires the introduction of the specific gravity factor; and in the experimental method this factor registers its own effect without the aid of the experimenter's calculation. When we find such values for "a" as 2.00, 2.32, 2.48 and 2.90 (each of which is considered later) it is not to be thought that some harebrain is suggesting a fanciful method of calculating volumes. The 2.00 expresses the fact that if the rock is reduced say one-half in particle diameter the quantity to be taken at the smaller diameter is 25% off the total stream; while 2.32 represents 20%; 2.48 represents 18%; and 2.90 represents 13½% of the stream. Any such exponent automatically indicates the total effect of all the peculiarities of a particular type of rock: the specific gravities of its individual minerals and its average specific gravity; its peculiarities of crystallization and the manner in which it breaks, due to peculiarities of fracture, and consequently from the progressive changes in segregation as crushing proceeds from coarse to fine stages. No value of "a" is introduced arbitrarily; each is experimentally determined by the qualities of the material, as we shall see later.

This matter is so important to a grasp of the basic idea of sampling that some elaboration is worth while. It has been questioned whether a particular value of "a" does in fact represent the progressive changes in segregation at successive stages in crushing a particular type of ore, as, for example, Richards' 2.00, Brunton's 2.32 or any of the values later shown in Table 4. Indeed, it has been stated that, to represent this effect we must progressively change "a" through a series of steps, from

(Continued on page 105)

† The wonder that the value of a large tonnage of material can be accurately determined from so small a quantity as a half gram to one gram is explained by the remarkable fact that even a half gram, ground through a 150-mesh screen, contains more than 100,000,000 particles, a quantity which, by the theory of probability, yields 0.03% precision in about 95% of all cases if the sample is taken in a systematic way.

Motor Maintenance

Part 1. How to Select, Install, and Maintain Electric Motors

By O. F. VEA*

PRESENT-DAY CONDITIONS make it necessary that all electric motors be babied. Maintenance programs must be intensified to prevent breakdowns, because 24-hour-a-day, 7-day-a-week war production schedules cannot be interrupted—output lost today cannot be made up tomorrow. Even the failure of an inconspicuous piece of equipment can cause a considerable disruption in production.

A real maintenance program begins with selection. Motors must be chosen that are properly rated and protected for their work. The selection involves a study of requirements, such as continuous or intermittent duty, starting, torque, speed regulation, and the like. These all have a bearing on just what type of motor to choose.

Tables I and II show characteristics and applications of standard a-c and d-c motors, respectively.

In addition, the environment in which the motor is to operate should be considered, as this determines whether an open motor or some form of enclosed motor should be used, and how the motor should be located with respect to the driven load.

Install motor so that is is accessible for inspection and repairs

The next point to be considered is installation. The most important items from the standpoint of long, trouble-free life for a motor follow: The motor should be located in such a way that it is accessible for inspection and repairs. Of course, it is always advisable to install the motor in a place free from adverse conditions unless it is built in a protecting enclosure. It is also important to see that the motor has ample ventilation so that heat losses will be carried away.

A standard motor should not be installed where the ambient temperature or normal temperature rise is more than 40 deg. C. The motor should be installed on a solid foundation which is free from vibration. If it is direct-connected or belted, care should be taken to secure proper alignment, which should permit rotor end-play within reasonable limits.

Connecting the Motor

All electrical connections to a motor should be made tightly enough so that the vibration of the equipment will not loosen them. Wires joined in a conduit box should be either twisted together and soldered, or bolted together. These joints should be wrapped first with rubber tape, and then with friction tape.

Wires issuing from a conduit box, especially rubber-covered extension cords, should be held in some way so that there is no strain on the con-

(Continued on page 82)

*Motor Division, General Electric Co.

TABLE I —CHARACTERISTICS AND APPLICATIONS OF POLYPHASE AC MOTORS

Polyphase Type	Ratings Hp	Speed Regulation	Speed Control	Starting Torque	Pull-out Torque	Applications
General-purpose squirrel cage	0.5 to 200 hp	Drops about 3% for large to 5% for small sizes	None, except multi-speed types, designed for 2 to 4 fixed speeds	200% of full-load for 2-pole to 105% for 16-pole designs	200% of full-load	Constant-speed service where starting torque is not excessive. Fans, blowers, rotary compressors, centrifugal pumps, wood-working machines, machine tools, line shafts
Full-voltage starting, high stg torque, low stg current, squirrel cage	3 to 150 hp	Drops about 3% for large to 6% for small sizes	None, except multi-speed types, designed for 2 to 4 fixed speeds	250% of full-load for high-speed to 200% for low-speed designs	200% of full-load	Constant-speed service where fairly high starting torque is required at infrequent intervals with starting current of about 400% full load. Reciprocating pumps and compressors, conveyors, crushers pulvisers, agitators, etc
Full-voltage starting, high-stg torque, high-slip, squirrel cage	0.5 to 150 hp	Drops about 7 to 12% from no load to full load	None, except multi-speed types, designed for 2 to 4 fixed speeds	300 to 315% of full load, depending upon speed and rotor resistance	300%. This motor will usually not stall until loaded to its maximum torque, which occurs at stand-still	Constant-speed service and high starting torque if starting not too frequent, and for taking high-peak loads with or without flywheels. Punch presses, die stamping, shears, bulldozers, hailers, hoists, cranes, elevators, etc
Wound-rotor, external-resistance starting	0.5 to several thousand	With rotor rings short-circuited, drops about 3% for large to 5% for small sizes	Speed can be reduced to 50% of normal by rotor resistance. Speed varies inversely as the load	Up to 300% depending upon external resistance in rotor circuit and how distributed	200% when rotor slip rings are short circuited	Where high starting torque with low-starting current or where limited speed control is required. Fans, centrifugal and plunger pumps, compressors, conveyors, hoists, cranes, ball mills, gate hoists, etc
Synchronous	25 to several thousand	Constant	None, except special motors designed for 2 fixed speeds	40% for slow-speed to 160% for medium speed 80% pf designs. Special high-torque designs	Unity-pf motors 170%; 80% .8 pf motors 225%. Special designs up to 300%	For constant-speed service, direct connection to slow-speed machines and where power-factor correction is required.

TABLE 2 Characteristics* and Applications of D-c Motors, 1 to 200 Hp

Type	Starting Duty	Maximum Momentary Running Torque	Speed Regulation	Speed Control †	Applications
Shunt-wound, constant-speed	Medium starting torque. Varies with voltage supplied to armature, and is limited by starting resistor to 125 to 200 per cent full-load torque	125 to 200 per cent. Limited by commutation	8 to 12 per cent	Basic speed to 200 per cent basic speed by field control	Drives where starting requirements are not severe. Use constant-speed or adjustable-speed, depending on speed required. Centrifugal pumps, fans, blowers, conveyors, elevators, wood- and metal-working machines
Shunt-wound, adjustable-speed			10 to 20 per cent, increases with weak fields	Basic speed to 600 per cent basic speed (lower for some ratings) by field control	
Compound-wound, constant-speed	Heavy starting torque. Limited by starting resistor to 130 to 200 per cent of full-load torque	130 to 200 per cent. Limited by commutation	Standard compounding 25 per cent. Depends on amount of series winding	Basic speed to 125 per cent basic speed by field control	Drives requiring high starting torque and fairly constant speed. Pulsating loads. Shears, bending rolls, plunger pumps, conveyor crushers, etc.
Series-wound, varying-speed	Very heavy starting torque. Limited to 300 per cent to 500 per cent full-load torque	200 to 300 per cent. Limited by commutation	Very high. Infinite no-load speed	From zero to maximum speed, depending on control and load	Drives where very high starting torque is required and speed can be regulated. Cranes, hoists, gates, bridges, car dumpers, etc.

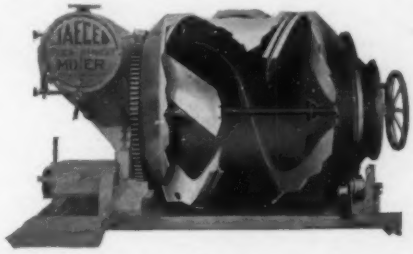
* Table shows average values for standard motors.
† Minimum speed below basic speed by armature control limited by heating.

Now That War Regulations Limit the Building of New Truck Mixers

WE ANSWER 2 QUESTIONS ABOUT JAEGER TRUCK MIXER FLEETS

1. "HOW LONG CAN MY PRESENT TRUCK MIXERS LAST?"

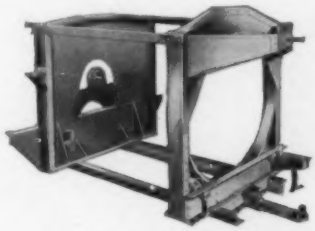
From the experience of hundreds of Jaeger fleet owners, over many years, it is safe to say that any Jaeger Truck Mixer, now in good condition, can be kept successfully in service for the duration of the war. Certainly, if given proper care and maintenance, your Jaeger Mixing Unit should easily outlast their present trucks.



Note that Jaeger's "Dual-Mix" Drum is self-cleaning — no pockets or corners to "build up" with concrete and require elaborate care or blade replacement.

Jaeger's Water System is simple, trouble-free. Clean out trap weekly. Give sensible winter care.

Jaeger's Transmission is shock-proof on all models; 2 speeds save engine wear. Lubricate at least daily.



The Jaeger Frame and 3-Point Mounting are time-tested — distribute weight to best advantage for long truck and tire life, prevent misalignment. All load bearing parts are of massive strength.

2. "WHAT WARTIME MAINTENANCE MEASURES DOES JAEGER RECOMMEND?"

Because of America's vital need for concrete and the fact that most equipment can no longer be replaced, your present truck mixers are literally priceless.

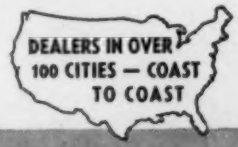
A. Make each of your operators responsible for his unit. Send for Jaeger Instruction Manuals and insist on careful operation and daily cleaning and lubrication as specified.

B. ARRANGE WITH YOUR JAEGER DISTRIBUTOR FOR A REGULAR 30-DAY CHECK-UP ON EVERY MACHINE.

This is your best insurance policy against breakdowns, long lay-ups and costly repairs. Jaeger service men know Jaeger mixing units just as your truck dealer knows his trucks.

Moreover, your Jaeger dealer carries thousands of repair parts in stock — as near to you as your telephone — to keep your mixers rolling. Back of him is our corps of Jaeger traveling engineers, on call to help Jaeger customers meet major problems of equipment maintenance or operation.

This nation-wide Jaeger organization is at your service. Use it to maintain *your own* service, so that you can help America to win this war.



THE JAEGER MACHINE COMPANY

603 Dublin Avenue • COLUMBUS • OHIO

Motor Maintenance

(Continued from page 80)

nections themselves. Usually a knot in the wire inside the conduit box, or the use of conduit-box fittings that grip the wire where it leaves the box, are the most convenient ways to obtain this strain relief.

A little extra care when starting a motor for the first time is a good investment. For example, trouble may be avoided by a look at the brushes of a direct-current or single-phase repulsion motor to make sure that they are seating properly on the commutator, and with the proper pressure. It is always good practice to turn the motor over by hand before applying power to be sure that it turns freely, and that no foreign materials or objects have fallen into the motor during shipment or handling.

Inspection

When the motor has been properly selected, installed, and connected, the maintenance program really begins. To insure efficient operation and maximum production, inspection and servicing should be systematic.

Frequency of inspection and degree of thoroughness vary, and will have to be determined by the maintenance engineer. They will be governed by (1) the importance of the motors in the production scheme (that is, if the motor fails, will the whole works be shut down?), (2) percentage of time the motor operates, (3) nature of service, (4) environment.

An inspection schedule must, therefore, be elastic and adapted to the needs of each plant. The following schedule, covering both a-c and d-c motors, is based on average conditions in so far as duty and dirt are concerned:

Every Week

1. Examine commutator and brushes.
2. Check oil level in bearings.
3. See that oil rings turn with shaft.
4. See that shaft is free of oil and grease from bearings.
5. Examine starter, switch, fuses, and other controls.
6. Start motor and see that it is brought up to speed in normal time.

Every Six Months

1. Clean motor thoroughly, blowing out dirt from windings and wipe commutator and brushes.
2. Inspect commutator clamping ring.
3. Check brushes and renew any that are more than half worn.
4. Examine brush holders and clean them if dirty. Make sure that brushes ride free in the holders.
5. Check brush pressure.
6. Check brush position.
7. Drain, wash out, and renew oil in sleeve bearings.
8. Check grease in ball or roller bearings.
9. Check operating speed or speeds.
10. See that end play of shaft is normal.
11. Inspect and tighten connections on motor and control.
12. Check current input and compare with normal.
13. Run motor and examine drive critically for smooth running, absence of vibration, worn gears, chains, or belts.
14. Check motor foot bolts, end-shield bolts, pulley, coupling, gear and journal setscrews, and keys.
15. See that all motor covers, belt and gear guards are in good order, in place, and securely fastened.

Once a Year

1. Clean out and renew grease in ball or roller bearing housings.
2. Test insulation by megger.
3. Check air gap.
4. Clean out magnetic dirt that may be hanging on poles.
5. Check clearance between shaft and journal boxes of sleeve-bearing motors, to prevent operation with worn bearings.
6. Clean out undercut slots in commutator.
7. Examine connections of commutator and armature coils.
8. Inspect armature bands.

The competent maintenance man will have a record card for every motor in the plant. All repair work, with its cost, and every inspection can be entered on the record. In this way, excessive amounts of attention or expense will show up and the causes can be determined and corrected.

(To be continued)

HAMMOND

MULTI-WALL PAPER BAGS

If you are critical about cement bags—you'll appreciate the fine qualities of Hammond Multi-Wall Bags. They're easy to fill, handle well, and most important of all, they're tough and are built to take a beating. They'll carry the load dependably from your Pack House to the job.

HAMMOND MULTI-WALL BAGS are carefully engineered to meet your most exacting requirements.

SEWN and PASTED BAGS for
ROCK PRODUCTS, FERTILIZERS,
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CONCRETE PRODUCTS AND CEMENT PRODUCTS

The ALL-CONCRETE HOUSE

Home of W. F. Paddock, assistant secretary, Graystone Concrete Products Co., Seattle, Wash. Foundation, walls, floors, and joists are concrete

Making 20,000 Blocks a Day

Ellis Concrete Products Co. produces 400 different sizes in a modern plant and maintains over 800,000 units in stock

By RALPH TORGERSON

MORE DIFFERENT SIZES are made by the Ellis Concrete Products Co., Bridgeport, Penn., than any concrete products plant in the country. Of the 400 sizes made, about 200 sizes are carried in stock, which is a record which will probably go unchallenged.

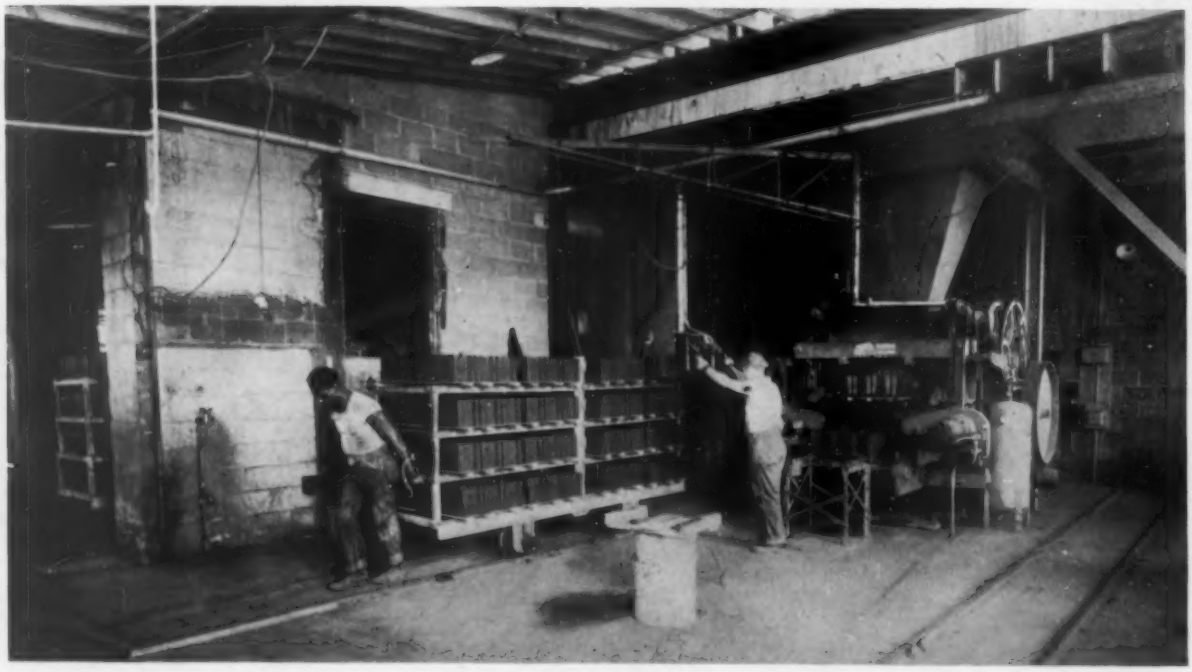
President WILLIAM H. ELLIS, better known as "Bill" to his many friends, believes that the purchaser should have anything in the way of special shapes that he may desire. A few of these different sizes are shown in one of the illustrations. All of them are made on a plain pallet.

The site of the plant is ideally located. It consists of nine acres of flat land surrounded on three sides by railroads and the fourth by a good hard paved highway, and is just outside Norristown, Penn., accessible to all parts of Philadelphia and surrounding counties. The plant is within easy reach of Phoenixville, Pottstown, Chester and the towns along the Delaware with large shipbuilding and factory installations.

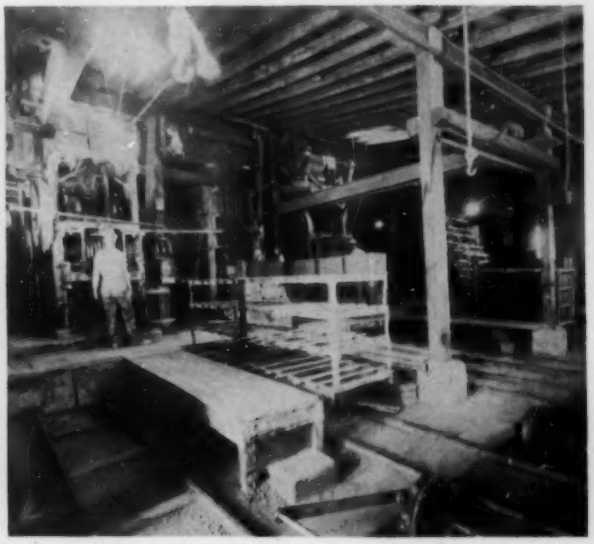
Just a few of the many sizes and shapes of concrete block made by the Ellis Concrete Products Co.

Block manufacturing equipment is all Besser; including three Super Stripper tampers with a capacity of 360 standard 8- x 8- x 16-in. units per hour, one automatic face down machine at 180 per hour, and a new Vibrapac with a capacity of 600 per hour. Total hourly capacity is about 1800 standard 8- x 8- x 16-in. units or equivalent, and approximately 20,000 units per day. Eventually, it is planned to replace all the tamper machines with Vibrapacs.

Machine capacity is an important factor, but it does not tell the whole story. The efficient layout of the equipment and manner of handling aggregates, cement, and finished product is equally important. As may be noted in the illustrations, all the block machines are lined up in a row at first floor level with the



Loaded rack car being pulled away from Vibrapac block machine to be rolled onto transfer car and thence into vapor curing rooms.



Left: In the foreground is a new 50-cu. ft. mixer for the Vibrapac. Four 25-cu. ft. mixers are over the tamper machines. Right: Battery of tamper machines on the floor below

off-bearing of finished units to the racks alongside taken care of in the usual way. All rack cars are equipped with flanged steel wheels operating over narrow gauge track to a transfer dolly and track at right angles to the block machines for movement into the curing rooms. Two men are employed in off-bearing on the tamper machines, and one on the Vibrapac.

All block machines are served with concrete by mixers located on a mezzanine floor, one mixer to each machine. There are seven Besser mixers; one 50-cu. ft., three 25-cu. ft., two 12-cu. ft., and one 5-cu. ft. Aggregate, principally cinders, is moved to each mixer by means of a traveling volume type batcher which obtains materials by chute from the large storage bin above the plant. However, in case a special material is desired it can be obtained from the steel tower at the end of the mixer line. This steel tower is equipped with a material bucket operating in a manner similar to the ordinary builder's hoist tower. The special aggregate can be put in the bucket at grade, elevated up to the top of the mixers and then run over the overhead rails to any mixer on the mezzanine floor. One man is available for operation of each mixer during full capacity periods.

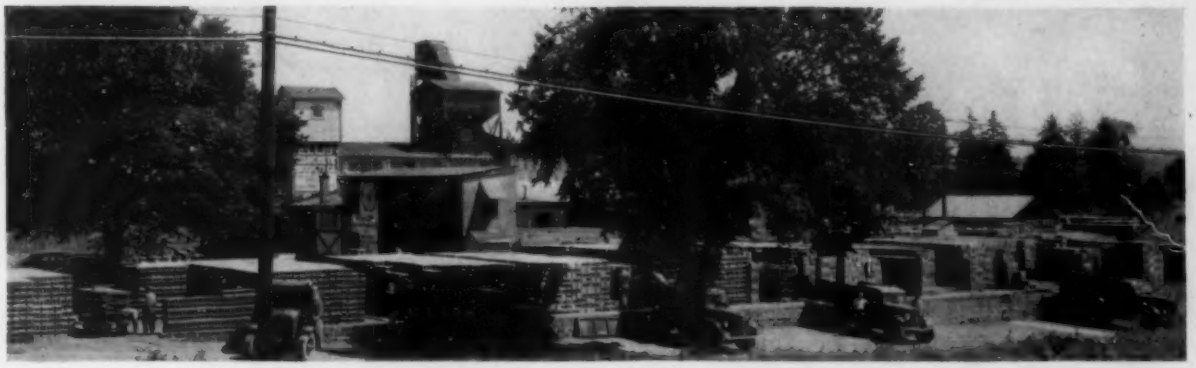
Cement is usually received in paper bags from box cars. A portable conveyor is used in handling the cement bags from box car to the mixer floor. About three cars of cement can be stored on this floor.

Finished block move by rail-mounted rack cars into six steam curing rooms, each of which is 8 ft. 6 in. by 55 ft. long. Their capacity is about 1200 block. Steam is introduced into the room under 100 p.s.i. Usually the units are cured in the rooms overnight, depending on shift operations, but generally the units are subjected to steam vapor from 8 to 12 hours. Yard storage between curing and delivery is about 30 days. Although stock carried in the yard amounts to about 800,000 units, there is sufficient room for 2,000,000 units. Units are constantly sent to the laboratory for tests to assure that uniform quality standards are maintained.

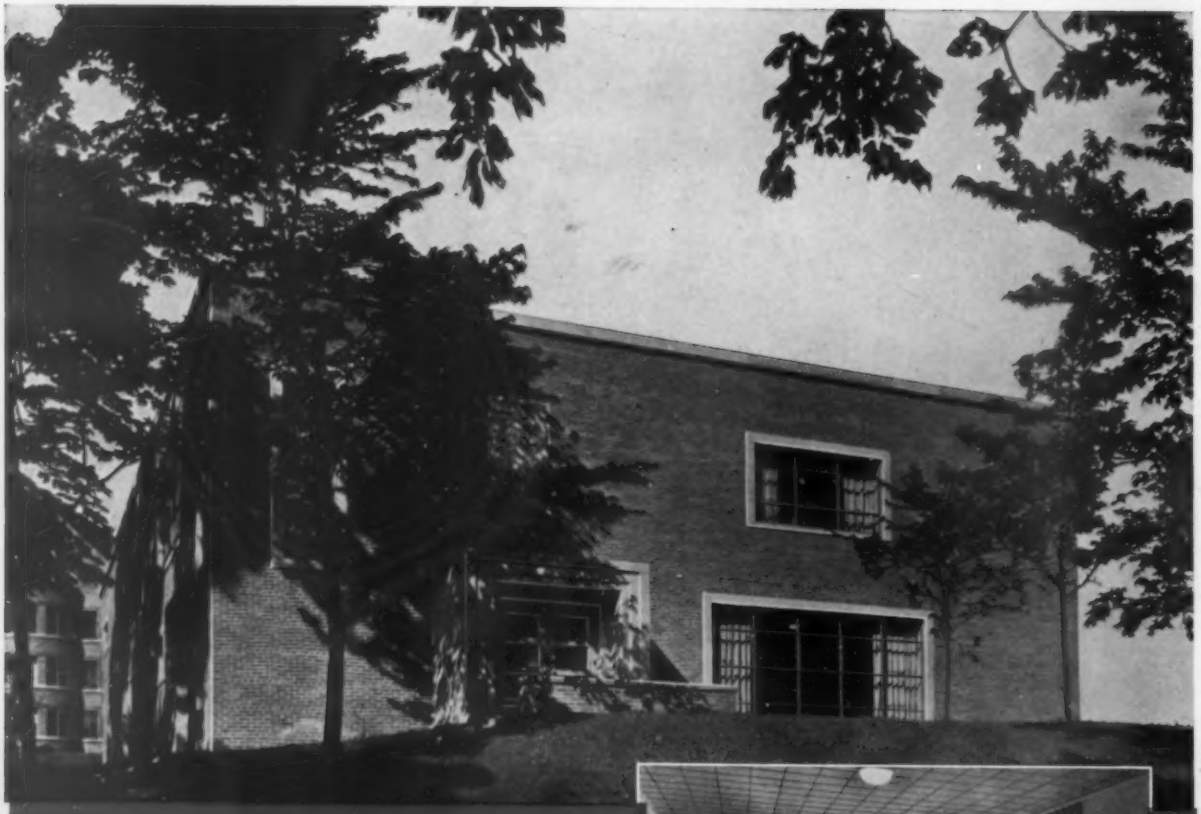
Nearly All Cinder Block

About 98 percent of the output is cinder concrete units and the other two percent is sand and gravel aggregate concrete. Cinders are received from various points by both rail and truck. The raw material is dumped into a hopper and carried by belt conveyor to roll crushers and then elevated to vibrating screens. The size of the cinder aggregate can be closely regulated by changing screen cloth and crusher setting and

(Continued on page 97)



Large storage yard for concrete block with plant shown in the background. Note convenient method of loading block by truck



Dramatic Arts Building, Western Michigan College of Education, Kalamazoo, Michigan. Architects: Malcomson, Calder & Hammond, Inc., Detroit, Mich.

General Contractor: DeKoning Construction Co., Kalamazoo, Mich.

Casper H. Haas, Kalamazoo, furnished 60,000 Stearns Joltcrete blocks, exposed in auditorium and on all interior partitions.

With Stearns Joltcrete Blocks you get the best building jobs

Here's what the Architects say:

"Stearns Joltcrete Concrete blocks, made with lightweight aggregate, were used because (1) their texture provides pleasing and decorative wall surfaces, (2) their acoustical properties are important in this type of structure, (3) elimination of interior plaster was an economy, and (4) their strength made them eminently suitable for load-bearing walls. Their performance on each of these points is most satisfactory."

STEARNS

MANUFACTURING CO. - ADRIAN, MICH.

GENE OLSEN, PRESIDENT

Although now operating 24 hours a day, 7 days a week, on war material, we are able to supply concrete block and brick machinery (vibration and tamp types), mixers and skip loaders for necessary construction work. Write for folders.

Concrete Products in the War

National Concrete Masonry Association convention reveals new markets for concrete

One of the best conventions ever held by the National Concrete Masonry Association drew nearly 400 members and guests to the meetings on February 16 and 17 at the Hotel Sherman, Chicago. The fine attendance at the War Conference sessions was a reflection of the serious character of the program and a fine testimonial to the genial Executive Secretary E. W. Dienhart. While "Dien," in a sense, merely carried on activities which he formerly did at conventions, he put new zest into the meetings, and kept the members' interest through somewhat lengthy sessions. The National Concrete Masonry Association is on its own and going places.

John Chase, chairman of the board, National Concrete Masonry Association, Fort Worth, Texas, presided at the Tuesday morning round-table discussion.

Secretary E. W. Dienhart started off the discussion by relating the fine cooperation which the Detroit concrete products producers had from the local A. F. of L. mason's union. He said that the bricklayers built a concrete masonry house in cooperation with the local block manufacturers for demonstration purposes. The other side of the picture was presented by Jack Friedman of Boston who told about the efforts which had been made to push through a bill in the Massachusetts legislature which would practically prohibit the use of concrete masonry. It was believed that competitive materials were back of this drive, but it was emphasized that more stress should be put on friendly relations with the man who lays up the block as it is to the mutual interest of both labor and block manufacturer to work together. Plastics and other materials will be the real competition for the bricklayer in the post-war period. Other restrictions mentioned imposed the use of two men for each block and lower scaffolding.

Panel Discussion

Ray Berger of Detroit and Ted Merryman told about the promotional activities in this territory. A typical panel discussion to which builders, contractors and union labor leaders were invited was carried out by Roy McCandless, Larry Hume, Ben Wilk, and Ray Berger. As an example of the results which have been obtained by getting together in this territory to do a real job of promotion, it was pointed out that 36,000,000 concrete masonry units were sold in Detroit in 1941. Herb Geist of Cleveland also has done a commendable job of concrete house promotion. Mr. Hume covered the subject of fire-safe construction; Mr. Wilk discussed foundations, footings, etc., and Mr. McCandless took up the subject of proper workmanship. Mr. McCandless cautioned against setting up the term "painting" in specifications when referring to the application of portland cement paint, and said it is preferable to use the term "waterproofing." Mr. Wilk explained how essential it is to have small house designs for concrete block laid out so that the dimensions will fit into a given number of full block units as near as possible. This will simplify figuring and cut down costs. Costs also should be set up on an easily understood basis of so much per square foot.

One of the crowded sessions at the recent war conference of the National Concrete Masonry Association in Chicago.

The Farm Market

E. L. Hanson, agricultural engineer, P.C.A., gave a very interesting talk on the possibilities of developing concrete masonry business on the farm. He pointed out that there are six million farms with an investment of 10 billion dollars in buildings. A half billion is spent on repairs to buildings every year. Mr. Hanson said that in one state alone 2200 milk houses were built. Farmers are prosperous this year, and will spend about $1200 a year per farm for new buildings and repairs.

Mr. Hanson suggested several ways of contacting the farm market. Some block producers had given free suppers to farmers, sent mailings to box numbers, and used other forms of advertising. Block should be sold for the entire job, he said, by selling the job as a package. Livestock truckers can be made salesmen by having

them make use of their truck space for return loads of block to farmers.

W. D. ALLAN of the P.C.A. was the luncheon speaker. Mr. Allan said that there are possibilities in moving idle block plants to areas where big jobs are being carried out This saves transportation as raw materials are usully close to the construction sites. He urged more post-war planning, and suggested that public works, locally financed, should be fostered. As evidence that the concrete products business has a future, he cited the fact that 20 clay tile companies had gone into the concrete products business.

Government Regulations and the Construction Program

JOHN L. HAYNES, director, Building Materials Division, War Production Board, outlined the construction program contemplated in 1943. Military construction and war housing is to drop, he said. However, building construction volume will be larger than for any year between 1931 and 1940.

Total construction in 1943 is estimated at more than eight billion dollars. Masonry construction will not drop in proportion to the total due to the restrictions on lumber. Certain areas will be freed from lumber restrictions in many sizes as, for example, on the West Coast where there is a surplus of 2x4's. Most of the Middle West and the East is restricted to masonry construction. Referring to the Controlled Materials Plan, Mr. Haynes referred to the form which must be filled out to obtain a quota of critical materials. He said there is nothing to worry about as to the establishment of nucleus plants, as the industry is now concentrated and supply and demand will take care of this. Concrete products plants not doing war work will not be given preferment from the War Manpower Commission. Mr. Haynes sounded an optimistic note concerning post-war business as there will be a large amount of deferred construction.

CARROLL SWEET, of the Chicago district office of F.H.A., pinch-hitted for Earle S. Draper, deputy commissioner, F.H.A. Mr. Sweet read Mr. Draper's paper and then answered questions from the floor. The N.H.A. program contemplates the construction of more than 300,000 housing units after July 1, 1943. War housing, however, will only be carried out to house immigration war workers. There has been some relaxation of restrictions, such as permission to use larger floor areas and more use of lumber in certain areas. He said that the National Housing Administration is the claimant agency for critical materials. An AA-3 priority will be given to all war housing. The N.H.A. also will determine type of construction, location,

John L. Strandberg, president, talking over convention plans with Secretary Dienhart.

etc. Mr. Sweet went into considerable detail in explaining the No. 60 orders; 60-1 covers qualifications of migrant workers moving into the area within a year; 60-2 and 60-3 establishes policy, occupancy, etc.; directive order 11-2 does not permit a sales quota, only the construction of buildings for rent.

Manpower

COL. IRVIN, of the Illinois Selective Service office, gave a very straightforward picture of the manpower situation and the workings of the Selective Service system as it will affect every employer. He said that industry will have to get along with the labor supply available; use more women, older men, and those who have been deferred for physical reasons. Col. Irvin said that title to the men between 18 and 45 belongs to the army and navy. About 11 out of 14 men between the ages of 18 and 38 will be in the armed forces before 1944. Men not called are the physically and mentally unacceptable or they have been loaned because their services are vital to military or civilian activities essential to the war effort.

Col. Irvin said that employers should present all facts as to the employe's essentiality, but do not ask for deferment unless he is irreplaceable. He explained that form 42-A is an affidavit for deferment, and 42-B is a form which advises the local Selective Board that the employe is presently classified 3-A but that he is a skilled man. This serves as a warning to the Board that the employe is a skilled, essential employe, and allows 15 days for appeal should the Board call up the employe for reclassification into 1-A; otherwise he may be immediately called into service. For employes 37 to 44, Col. Irvin suggested that a letter be addressed to the Board attesting to the employe's essentiality. This is a protection in case the President may order drafting employes from 37 to 44, inclusive, which are now deferred by executive decree. Col. Irvin urged every employer to start negotiations for an inventory of manpower and the filing of a Manpower Manning Table with the regional office of Selective Service. Referring to the recent announcement of the War Manpower Commission statement concerning certain classifications of employment as non-essential, Col. Irvin said it was his opinion that any concrete products manufacturer having a war housing job would be considered part of an essential industry. He said that Occupational Bulletin 33 would help in clarifying the question of essentiality.

Priorities and Price Ceilings

EDMUND H. BROOKE, head of the Concrete Products Unit, Building Materials Division, W.P.B., and a former concrete products manufacturer, in opening his talk suggested that anyone who had a problem concerning priorities should address a letter to his office and a reply would be forthcoming. Mr. Brooke hit the high spots in priorities procedure. He said the L-order is one which limits right of sale and this may be appealed. P-100 extends an A-10 priority for repairs; PD-1-A is used for application for maintenance supplies and parts, also small capital items. PD-3-A permits the purchase of operating supplies on priority extended by the war contractor. PD-200 is an application for construction facilities. This might include pipe and block machines, but it takes a lot of time to process through. PRP worked fine for the concrete products industry in obtaining raw materials, but it will be out the window April 1, in favor of the new Controlled Materials Plan. Under an MRO order, CMP, an AA-1 priority will be given for repairs, and a 60-day inventory will be allowed.

FRED C. BAMMON, chief, Cement and Concrete Products Unit, Building Materials section, O.P.A., talked about General Maximum Price Regulation No. 188 and how it affects the concrete products industry. When a war contract is accepted, procedural No. 6 permits insertion of a clause reserving the right to stop deliveries if the price filed with the O.P.A. is not accepted. On the question of

prices where a portable plant is set up, a new price can be filed taking into consideration the increased costs but this price will be judged on the basis of the regional prevailing price. A new adjustment in prices is to be provided for in an amendment to the regulations where labor shortages prevail. Mr. Bammon said that War Labor Board procedure should not interfere with the filing of a change in price with O.P.A. due to a wage increase. On the question of passing on the Federal 3 percent transportation tax, Mr. Bammon said that inboard increases in transportation costs cannot be passed on. Outboard transportation increases can be passed on to f.o.b. quotations based on the highest March, 1942 price. A delivered price quotation in March must absorb increases in transportation cost.

Discussion—Portable Plants

PRESIDENT JOHN STRANDBERG, in launching the Wednesday morning session, told about his experience in moving a concrete products plant to the vicinity of a war job in Arkansas. This plant was later transferred to Waco, Texas, where it was loaned to John Chase of Fort Worth who signed the contract for the block. A three-way deal also was consummated with a Wichita, Kans., plant that did not have sufficient capacity to handle a large war job.

NORMAN NICHOLLS of the P.C.A. New York office described the portable plants set up near Albany, N. Y., by John A. Johnson Contracting Corp., to supplement local concrete masonry production which was insufficient to meet the tremendous demand. Secretary Dienhart said that wherever possible the deals to supplement production should be worked out with the local producer.

E. W. Dienhart, executive secretary, leading round-table discussion.

SECRETARY E. W. DIENHART in his annual report expressed his appreciation for the honor conferred on him through his appointment as executive secretary of the National Concrete Masonry Association, and also for the cooperation extended by President John L. Strandberg and Chairman of the Board John Chase and many others. He referred to research work being carried on through the P.C.A. in the development of a grain bin design. A relatively cheap vibrating table also has been developed for the manufacture of concrete specialties. Possibilities of concrete block for concrete "igloos" for the storage of ammunition have been studied. A production and material survey of the industry also is being made.

PRESIDENT JOHN STRANDBERG in his address complimented the association on the step taken to stand on its own feet and have a paid secretary. He also mentioned the passing of Dan Servey, past president, and an active member for many years.

He drew a comparison with the clay tile and brick industry, and said concrete masonry has passed its competitor as the leading producer. A production of 500 million block is equivalent to six billion brick. The clay industry had a production of 4½ billion brick. If block were substituted for lumber it would require six times the present capacity of the concrete masonry industry. President Strandberg suggested a ten-point program for the industry. He said production should help the progress of the war effort. New products should be developed. Agencies of the government should be constantly contacted. An active part should be taken by the association in promoting standards before the various technical associations affecting the use of concrete products. Relations with mechanics using the product should be improved. A news magazine should be published for circulation among architects and builders. Every member of the industry should be enlisted in the work of the association. The industry also should be alert to the development of post-war business.

New Officers and Directors

A change in the by-laws of the Association was voted upon increasing the directorate which will now constitute 12 in addition to the chairman.

Officers and directors of the Association are as follows: Chairman of the Board, John L. Strandberg, Concrete Building Units Co., Kansas City, Mo.; president, Walter Manhardt

John Chase, chairman of the board.

(1943), Best Block Co., Milwaukee, Wis.; vice-presidents, Ray A. Berger (1944), Martin Berger Co., Detroit, Mich.; Harold Spaight (1944), Cedar Rapids Block Co., Cedar Rapids, Iowa; and F. W. Reinhold (1944), Anchor Concrete Products Co., Buffalo, N. Y.; secretary-treasurer, Clarence E. Ehle (1945), Cleveland Builders Supply Co., Cleveland, Ohio; executive committee includes foregoing officers.

The officers and the following comprising the directorate: M. W. Ferguson (1943), Cinder Block, Inc., of Roanoke, Roanoke, Va.; Deane R. Lynde (1943), Cinder Concrete Products, Inc., Denver, Colo.; Henry Muller, Jr. (1943), Forest Hills Concrete Block Co., Forest Hills, L. I., New York; Claude Chandler (1944), Chandler Materials Co., Tulsa, Okla.; John S. Bailey (1945), Concrete Manufacturing Co., Atlanta, Ga.; Herb. A. Davis (1945), Washington Concrete Products Corp., Arlington, Va.; and S. Paturzo (1945), V. Paturzo Bros. & Son, Inc., Baltimore, Md.

Ex Officio members of the board are: Benjamin Wilk, Standard Building Products Co., Detroit, Mich.; Geo. H. Krier, Nailable Cinder Block Co., Brooklyn, N. Y.; Harve E. Kilmer, Iowa Concrete Block & Material Co., Des Moines, Iowa; Roy N. McCandless, Cinder Block, Inc., Detroit, Mich.; and John S. Chase, Chase Building Products, Inc., Fort Worth, Texas.

New Markets

FRED REINHOLD of Buffalo, N. Y., presided at the final session on

Wednesday afternoon. He introduced HAAKON PAULSON, Besser Manufacturing Co., who showed a colored moving picture of some of the outstanding defense housing jobs in the United States. The picture also showed the attractive possibilities of scoring standard 8- x 8- x 16-in. units to give an ashlar effect. Painting the walls different colors also has been done very effectively.

Mr. Reinhold displayed a colored calendar which could be obtained very reasonably if purchased in large quantities by ordering in bulk by a number of companies.

W. G. KAISER, manager, Cement Products Bureau, P.C.A., led the discussion of new products by showing slides of various applications of concrete products stimulated by the war effort. NORMAN NICHOLLS told about the transformer protection walls of concrete masonry used in the East. DEANE LYNDE said that all transformer installations of the Kansas City Power & Light Co. are protected by walls from 16 to 20 ft. high. MR. SHERMAN of Milwaukee suggested the possibilities of concrete masonry protective walls for protane and butane gas plants. JACK NEWELL of Mid-West Concrete Pipe Co. said that lightweight block for protective walls is better than heavy weight block, as the heavier block tends to shatter.

Reference was made to the manufacture of keel block in the East for the shipyards to replace heavy timbers. The market for ballast block is relatively small as a cheap source of heavy aggregate (iron ore) is required, up to 160 lb. per cu. ft.

Considerable discussion developed on the manufacture of manhole covers and frames. Jack Newell of Mid-West Concrete Pipe Co., told about his experience in the manufacture of concrete manholes. He said the principal difficulty was with the welding of the reinforcement as there are up to 60 points where the reinforcing must be tied together in some designs. Paul Woodworth of the P.C.A. used a blackboard to explain the various designs which had been tested. Different reinforcing patterns were tested to reduce the number of weld points. The best design was reduced to 20 points of welding using 8 lb. of steel. The manhole cover was 27 in. in diameter and 3 in. thick and was tested to 26,500 lb. Concrete was vibrated and the product was steam cured. Designs with less weld points did not have as good strength tests. Another product is a drainage inlet grating used at airports.

Concrete shower base receptors also are being made in considerable volume. The design made by Badger Concrete Co. occupies the same floor area as a bathtub so that a bathtub can replace the base when they may be obtained. The Advance Cast Stone Co. makes a smaller size.

Concrete Specialties

OTTO BUEHNER, Salt Lake City, Utah, told about the manufacture of concrete bath tubs for 2000 houses in 90 days. He also said that the manufacture of kitchen sinks and laundry trays had been carried on successfully. Complete details regarding the manufacture of these concrete bath tubs, traffic buttons, and other products can be found in the October and December issues of ROCK PRODUCTS.

PAUL WOODWORTH called upon Herb Dahlquist, past president of the National Concrete Burial Vault Association to tell something about the problems of the burial vault industry. No reinforcing was allowed by W.P.B. after December 31, 1942, but efforts are being made to obtain relief from this stringent order. Tests have been made of concrete burial vaults without reinforcing, using a 5000-lb. concrete.

T. D. SHIELDS gave a very inspirational address at the close of the meeting, complimenting the association for taking the step it had made in establishing a more aggressive organization with a paid secretary. He pointed to the Detroit producers as an example of what can be done to promote the use of concrete products.

Cast Stone Institute Holds Meeting

A MEETING of the Cast Stone Institute was held at the Bismarck Hotel, Chicago, simultaneous with the meetings of the National Concrete Masonry Association. There was a good representation of members from the industry, and much enthusiasm was displayed in the progress being made in developing new products. Gilbert Walker, managing director of the Institute told about the progress of the research work in Washington, D. C.

New Officers

New officers elected at the meeting were: President, Ernest Wiedeman, Richmond, Va.; vice-president, Edward Olson, Oshkosh, Wis.; and secretary-treasurer, Otto Formigli. Directors are Arthur Downing, Edmunds Art Stone Co., Washington, D. C., Lee Young, Geo. Rackle and Sons, Cleveland, Ohio, and the officers.

Cinder Concrete Meeting in Chicago

MANUFACTURERS of cinder concrete products held a meeting in the Sherman Hotel at 7:30 p.m., February 16, with a very good representation of National Cinder Concrete Products Association members in attendance. Secretary Harry H. Longenecker presided. At this session, Mr. Copeland, in charge of the research program, told about the progress of this work. This program covered painting, treatment of cinders, removal of deleterious substances, etc.

Investigations of pop-outs and stains in the finished wall indicated that free lime in the cinders, iron sulphides, and tramp iron were the chief offenders. Tests and specifications covering these problems are difficult to develop, it was brought out. It was requested that samples be sent in where trouble of this sort has been experienced.

Steam Heating Cinders to Prevent Pop-Outs

DEANE LYNDE of Denver told about his experience in curing locomotive stoker cinders with live steam at 180 deg. F. No trouble with staining and pop-outs was experienced after this treatment was given. Screening takes out any tramp iron. The combustible content of the cinders is very low. The discussion also brought out that the iron may not be magnetic and the magnetic separator may not take it out.

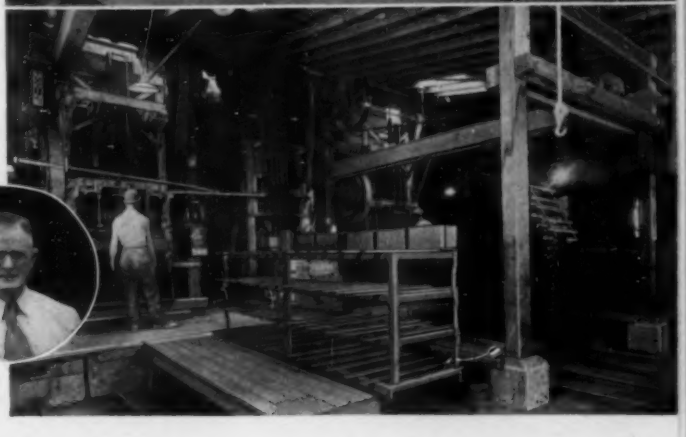
Findings of Dr. Brown, petrographer of the Bureau of Standards, showed from examination that the cause of pop-out was indicated to be the presence of free lime, a golden brown mineral not identifiable, and pyrites. It was brought out that with high pressure steam curing, pop-outs and staining will show up after the block comes out of the autoclave and therefore can be removed from the stockpile. FRED W. REINHOLD of Buffalo, N. Y., said that it would be better to improve the method of processing cinders. He described the Bo process which removed from cinders the coke and free lime and neutralized the sulphur by a combination of screening, magnetic separation, and a bath in hot water. The coke was salvaged and practically paid for the opertion of the process.

LEADERS in the Concrete Products Industry*

* This is the twelfth of a series of advertisements featuring leaders in the concrete products industry who have installed Besser Vibrapacs to step up production of high quality concrete masonry units. Reprints of previous advertisements sent on request.

The Ellis Concrete Products Co. of Bridgeport, Pa., is one of the largest and most efficient plants in the country. This plant has served the Philadelphia area for 28 years and has operated Besser Block Machines for 19 years. The plant is now operating 4 Besser Plain Pallet Tampers and a Vibrapac which was installed in March, 1942. They make over 400 different shapes and sizes—200 of which are carried in stock—all on plain pallets. The total hourly production is over 1800—8" or equivalent. The Ellis Company is 100% on war production.

WILLIAM H. ELLIS
President
Ellis Concrete Products Co.



Undirectional vibration under Flam patents (other patents pending) was employed to make the first vibrated blocks ever produced commercially. The Besser Vibrapac combines undirectional vibration with the exclusive Besser Plain Pallet principle. Users of these machines are fully protected under Besser and Flam patents.

BESSER MANUFACTURING CO.
203 Forty-Third St. • Alpena, Mich.
Complete Equipment for Concrete Products Plants

THE SAVING IN PALLET COST WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER

War-Time Problems of Pipe Industry

American Concrete Pipe Association convention in Chicago hears talks by government leaders, and learns about new products and post-war possibilities

A TWO-DAY SESSION of the American Concrete Pipe Association was held at the Drake Hotel, Chicago, on February 17 and 18 with a good attendance from every section of the country. Texas and California had particularly good representations for such distant states.

PRESIDENT R. A. FOLEY in his address commented on the progress made during the year in the Association's activities and the plans for the future research studies. M. W. LOVING, secretary-treasurer, and T. J. KAUER, assistant secretary and Washington representative, presented their reports on the first day of the meeting.

H. E. BABBITT, professor of Sanitary Engineering, University of Illinois, gave a fine extemporaneous address interspersed with some real humor. His talk on the "Future Outlook in the Sewerage Field" emphasized the importance of the sanitary engineer in the post-war period. He said that the Army had drafted every sanitary engineer that was available into the commissioned ranks as these men are of prime importance in preparing camps, airports, and other military installations for healthful use.

Forum on Industry Problems

E. F. BESPALOW, Choctaw Culvert & Machinery Co., led the forum discussion. Secretary Loving started the ball rolling in a very interesting discussion of industry problems, particularly as they are affected by the war. Some 20 slides were displayed on the screen, showing the proper installation of large concrete pipe. Pictures were shown of tests of 48-in. concrete pipe, some sections of which were lightly reinforced and other sections without reinforcing. The Technical Problems Committee is to make further tests of pipe during the coming year.

DR. GUS W. DYER, professor of economics, Vanderbilt University, Nashville, Tenn., was the speaker at the annual dinner.

Thursday Session

R. D. BRADBURY, engineer-director, Wire Reinforcement Institute, Washington, D. C., was on the program to address the convention on the "Availability of Welded Steel Wire Mesh Reinforcement for Concrete Pipe," but he was unable to be present and his paper was read to the meeting. Mr. Bradbury pointed out that plenty of wire mesh reinforcement was available to any company having a war contract as this steel is in class B.

H. G. SOURS, director, Department of Highways, Columbus, Ohio, in his address on the Future Needs of Public Roads in the United States, said that the post-war problem is to develop the highway system near the larger cities as 80 to 90 percent of the travel density on the highways is within a comparatively short radius of metropolitan centers. This program will involve a substantial amount of drainage facilities. Farm-to-market roads also will be required. Mr. Sours expressed the view that there would be considerable flight-strip construction after the war along main highway routes to provide emergency landing fields for airplanes. A number of states are now laying plans for post-war projects. Minnesota is an outstanding example of the states which are now accumulating a post-war highway fund to take up any slack in employment.

R. E. Foley, retiring president of the American Concrete Pipe Assn.

H. ESCHENBRENNER, president of the Universal Concrete Pipe Co., Columbus, Ohio was introduced as the next speaker with a good deal of banter about "his invasion of other states with paratroopers." His subject was "What Members Can Do to Improve Our Association." Mr. Eschenbrenner said that the industry should prepare now for the post-war period. The wise concrete pipe man, he said, will take advantage of the present period to visit all his customers as "you cannot hibernate in the interval before post-war business picks up." He urged the industry to do more advertising and promotional work. Mr. Eschenbrenner punctured the "myth and illusion" of elliptical steel reinforcement. He said the industry should use more effort in getting newcomers into the association, and he urged the setting up of regional groups of concrete pipe manufacturers within the frame-work of the American Concrete Pipe Association. The Washington office, he said, has been of real value, and suggested that perhaps the concentration of all association activities there should be considered. Mr. Eschenbrenner also suggested that national advertising be carried in all trade papers.

Prestressed Reinforced Concrete Pipe

PAUL OSWEILER, chief engineer, Lewistown Pipe Co., Chicago, Ill., showed some interesting colored moving pictures of the manufacture of prestressed concrete pressure pipe. This pipe is made by the spun process, and a complete description of the plant appeared in the May, 1941, issue of ROCK PRODUCTS. The company is now making 36-in. pipe for the City of Chicago capable of withstanding 200 p.s.i internal pressure.

EDMUND BROOKE, head of the Concrete Products section, Building Materials Division, WPB, spoke for John L. Haynes, head of the Division, who could not be present. Mr. Brooke urged all producers to file CMP form 4-A, to assure receiving its quota of critical metals. He said that the industry was entitled to a 60-day inventory supply, but some members said that this did not offer sufficient protection for those who had to bid

on emergency orders from the Army and Navy for airport jobs as pipe has been classified as an "A" product. A resolution was offered that a letter be addressed to WPB from the Association seeking to have concrete pipe classified as a "B" product to facilitate obtaining reinforcing steel. A motion also was carried that the American Concrete Pipe Association be represented on the WPB Advisory Committee on Pressure Pipe.

Accelerated Curing of Concrete

PAUL WOODWORTH, technical engineer, Cement Products Bureau, PCA, told some interesting facts about curing concrete. He said that cylinder tests of concrete cured in a moist atmosphere at 70 deg. F. showed a strength at one day of only 10 percent of the strength of the concrete at 28 days, considered as 100 percent, and 2000 lb. compressive strength. At 14 days the concrete showed 45 percent of its 28-day strength. In 36 days the strength would go to 2400 lb.; at the end of the year, 3600 lb., and at the end of ten years, 4800 lb. It was pointed out that accelerated curing is largely done to facilitate manufacture. Boiling water does not accelerate curing as compared with 70 deg. temperatture.

Some data indicates that with reinforced concrete, curing temperatures above 100 deg. reduce the bond of the concrete to the steel. There is some additional strength with temperatures above 70 deg., up to about 90 deg., but it is difficult to maintain moisture saturation at the higher temperature. The discussion brought out that semi-dry mix conditions are different than for mixes used in the manufacture of concrete pipe where more water is required to obtain the desired compaction.

New Officers

Election of officers resulted in the following slate: President W. E. Corbett, Corbett Concrete Pipe Co., Milford, Mass.; first vice-president, E. L. Johnson, Concrete Conduit Co., Colton, Calif.; second vice-president, C. W. Diecks, Lock Joint Pipe Co., Ampere, N. J.; and third vice-president, L. D. Bailey, Elk River, Minn. Directors were elected as follows: H. B. Tellyer, Tellyer Concrete Pipe Co., Albuquerque, N. Mex.; H. Eschenbrenner, Universal Concrete Pipe Co., Columbus, Ohio; M. C. Shaw, N. C. Products Co., Raleigh, N. C., and retiring president, R. E. Foley, Gifford-Hill Pipe Co., Dallas, Texas.

Wisconsin Products Men Meet in Milwaukee

WITH PRESIDENT ED OLSON, Badger Concrete Co., at the controls, the Wisconsin Concrete Products Association convention in Milwaukee, Wis., February 11 had a very successful program with about 60 in attendance. Art Devos, secretary, read his report and L. E. Schwalbe's report as treasurer which showed a comfortable balance in the treasury. Mr. Brevik of the P.C.A. Milwaukee office told about the revised State Building Code and suggested that the Code Committee contact the Industrial Commission on strength requirements. Fire ratings rather than type of construction will be the controlling factors.

New Officers and Directors

Directors elected for the ensuing year are as follows: Art Devos, Herbert Loucks, William Goetzinger, Ed Olsen, Otto Frey, L. E. Schwalbe, A. Vander Heyden, A. C. Jensen, and Elmer Strong. Officers elected by the directors are: President, Herbert Loucks, Madison; first vice-president, William Goetzinger, Milwaukee; second vice-president, A. C. Jensen, Racine; secretary-treasurer, Art Devos. The matter of representation of the concrete products industry at the Milwaukee Home Show was left to the Board of Directors for decision.

W. W. GATES, chief underwriter, F.H.A., Milwaukee, Wis., could not be present. Mr Gottschalk of W.P.B and Mr Le Croy of F.H.A. did a fine job of pinch-hitting for him. It was announced that 400 additional housing units for Milwaukee had been added to the construction quotas. Certain liberalization of the requirements was made which would permit increasing the floor area 10 percent and the use of soft wood floors are now allowed. After April 1, 1943, all exterior walls must be of masonry. In the discussion which followed, Mr. Le Croy said that any concrete house is eligible for F.H.A loans. Plaster, he said, can be applied direct to walls if outside walls are waterproofed with two coats of Portland cement paint, however, it is preferred that furring or wall board be applied first. Another requirement with concrete masonry is the use of a solid course at floor levels to provide a larger bearing area for joists.

Mr. Gottschalk said that reinforcing steel can be obtained for concrete floors but only with relation to available quotas of critical materials. It is therefore imperative that as little steel be used as possible to permit a larger amount of housing with the essential metals required.

In the matter of farm construction, Mr. Gottschalk said in response to a question by Mr. Loucks that a 10-year loan can be obtained with a $5 discount instead of the usual 4 percent. Where priority is required PD 105 is used for new construction and PD 200 for old construction requiring remodeling. Where critical materials enter into the construction, L-41 permits expenditures of $1000 every 12 months and this can be made accumulative. The $1000 only includes materials, and the farmers' own labor is not considered. No WPB authority is required unless critical materials are necessary.

Farm Market

W. G. KAISER, manager, Cement Products Bureau, Portland Cement Association, Chicago, gave a very interesting talk on the Farm Market for Concrete Masonry which he illustrated with slides of typical new and remodeling construction. Mr. Kaiser said that every year in Wisconsin from 500 to 700 farm buildings are destroyed by fire. He estimated that 3000 block or more are required for a barn. In 1942, he said, 2000 barns were remodeled, 2000 milk houses were built, and as a further evidence of the market pointed out that 200,000 poultry houses are required in Wisconsin. The 186,000 farms in Wisconsin represented a $24,000,000 construction market in 1940. Mr. Kimmel, district engineer of the P.C.A., followed Mr. Kaiser with a summary of the promotional work which the association proposed to follow in 1943. Mr. Kaiser said that the ODT officials are apparently very much in favor of stimulating return loads for livestock haulers, and this offers an opportunity to ship block to farms at a relatively low cost.

E. W. DIENHART, executive secretary of the National Concrete Masonry Association, told about the plans for

promoting the use of more concrete masonry under the new set-up of the association. He pointed out that practically all construction will be government controlled and that the industry must present a better case before Washington and local officials of the government. It is essential that the concrete masonry industry publicize its importance, and to better analyze its market. The industry, he said, has been too slow in going after the market for concrete specialties. Mr. Dienhart said that EDMUND H. BROOKE is the new man in charge of W.P.B. in charge of concrete products, and it is believed that he will be sympathetic to the industry's needs.

Mr. Ickes' Cement

SECRETARY of the Interior, Harold L. Ickes, thinks his Puerto Rico Cement Corp. is doing a good job and has come in handy because of the shortage of ships. The cement corporation which began operations early in 1939 had accumulated $589,407 in profits and paid roughly $100,000 in dividends by May 31, 1942, according to the report submitted to the Secretary by Guy J. Swope, Director of Territories and Island Possessions.

Saves 12,000-Mile Cement Shipment!

AMERICAN PORTLAND CEMENT manufacturers have learned by experience that distances mean nothing to U. S. government purchasers. Far be it from any desire to deprive them of business, but the following from an O.W.I. release is certainly an interesting commentary on government purchasing agencies—the mere fact that they find cause for boasting:

"By thoroughly combing the materials market abroad the agencies responsible for construction not only reduced shipping space requirements, but speeded the work.

"One case in this connection, occurred in the Far East, where thousands of tons of cement were needed. When it was discovered that a large cement mill capacity existed in this area, and that the country had an exportable surplus, orders for American cement were canceled by the engineers in charge and the equivalent of one 10,000-ton vessel for a year was saved.

"A somewhat similar case occurred in Alaska. When it was indicated that lumber was being shipped to Alaska, the agency concerned substituted portable saws which, taking a very small amount of space, saved the equivalent of many thousands of tons of shipping space."

We have all heard of "carrying coals to Newcastle," but shipping portland cement halfway around the world and lumber to Alaska with shipping hazards what they are, to say nothing of shortage of shipping space, makes "coals to Newcastle" a 30-cent transaction.

Pavement Yardage

AWARDS of concrete pavement for January, 1943, have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During January, 1943
Roads	541,153
Streets and Alleys	630,858
Airports	5,065,170
Total	6,237,181

Dayton Buys Cement

DAYTON, Ohio has approved through the City Commission the purchase of cement for the first quarter of the year. The agreement with the Edgemont Coal and Cement Co., provides for Miami cement at $2.36 a bbl. in carload lots, and $2.50 a bbl., f.o.b. city trucks at their warehouse, with an additional two cents on these prices for certified cement.

YOUR GOVERNMENT KNOWS A GOOD BRICK-MACHINE WHEN THEY SEE IT

Jackson Brick machines are continuous in operation. They fill one pocket, compress one brick and remove one all at the same time. They produce up to 28,000 concrete bricks in an eight-hour day. They eliminate the need of costly pallets.

Uncle Sam is, today, our only new machine customer. But for information about used units available, write to

JACKSON & CHURCH COMPANY
SAGINAW, MICHIGAN

WAR MEMO

YOU SHOULD NEVER FORGET WHY YOU SHOULD BUY

The aims behind the War Bond Payroll Savings Plan are—

1. To help pay the stupendous production costs of winning this war.

2. To siphon into production channels that portion of America's *current income* which would otherwise flood the Nation with inflationary cash.

3. To create individual backlogs of financial security for use during the industrial readjustment after the war.

4. To create a Nation-wide saving habit which will serve the interests of both Capital and Labor after the war.

Keep after that "10% of gross payroll goal"! Buy War Bonds to the limit yourself—encourage your employees to do likewise!

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

What to Do with High Pressure Steam Cylinders?

Sand-Lime Brick Association Also Thinking of Other Products

THE Sand-Lime Brick Association met in Chicago, Ill., February 16 and 17, with J. W. Van Brunt, president, presiding and J. Morley Zander, secretary. Nine other manufacturers were present, representing operations from New York to Seattle and from Alexandria, La., to Windsor, Ontario.

The sessions were very informal but also very informative as to methods of operating plants and merchandizing the products. However, except in rare instances where federal government building projects are being served, the industry is not very active and its members expect still less business before the post-war building revival.

High-Pressure Steam Cured Concrete Products

Practically all sand-lime brick manufacturers have turned to concrete building block manufacture, curing the block in the pressure steam cylinders used for sand-lime brick. There is much advantage in high pressure steam curing over ordinary steam or water-vapor curing, the principal one being the very appreciable reduction in subsequent shrinkage. The industry is interested in seeing an accepted definition of "high pressure" steam curing, for the majority of customers do not know or recognize the difference between ordinary steam curing and high pressure steam curing.

An example of the popular misunderstanding was given in an article in a contemporary magazine, whose editor should have known better, by describing a concrete products plant's curing rooms (sometimes inaccurately called "kilns") as having a steam pressure of 15 lb. and a temperature of 140 deg. F. Obviously, the curing was done with warm water vapor, since a temperature of anything less than 212 deg. F. could not retain steam; and actually 15 lb. steam pressure would result in a temperature considerably more than 212 deg.

In sand-lime brick manufacture steam pressures are seldom less than 100 lb. and frequently 150 lb. and the minimum curing period is about 6 hours. Consequently when these manufacturers make high pressure steam cured concrete products, they don't want them confused with steam-vapor cured products.

Other Uses for Pressure Cylinders

With the falling off in building construction in most of the localities where sand-lime brick plants are located, the owners are looking about for other uses for their pressure steam cylinders. For example there appear to be possibilities in the wood veneer plastics industry — products like airplane parts that are built up of thin veneers of wood with resin in between, which by means of steam pressure are molded into plastics of almost any shape or form.

Creosoting or other wood preserving processes requiring pressure cylinders is another possible use. Even the drying or dehydrating or processing food products is being considered. There are many uses for pressure cylinders in modern industry, and the sand-lime brick industry has them and the boilers and crews to work them.

J. Morley Zander, secretary

J. W. Brunt, president, Sand-Lime Brick Association

Officers Reëlected

J. W. VAN BRUNT, Grand Rapids, Mich., was reelected president; L. J. RYAN, Windsor, Ont., Canada, was reelected vice-president; J. MORELY ZANDER, Saginaw, Mich., secretary; the executive committee, C. A. PERKINS, Mishawaka, Ind.; RALPH CROMIS, Pontiac, Mich.; and ELMER COATES, Seattle, Wash., who was also reelected western secretary.

Mr. Coates was unable to be present. In addition to the other officers and committee members present, the following manufacturers attended: Geo. Connell, Alexandria, La.; F. C. Dall, Mishawaka, Ind.; Harold J. Levine, Long Island City, New York; Geo. MacDearman, Baton Rouge, La.; O. H. McGill, Seattle, Wash.; Carl Miller, St. Louis, Mo.; Frank Perkins, Mishawaka, Ind.

Limit Scientific Equipment

DUE TO SHORTAGES of scientific equipment, the WPB has issued a limitation order that 600 manufacturers and 3000 laboratories engaged in research work "unrelated to the production of materials, or in any other research not directly connected with the war effort," must secure WPB authorization to receive new laboratory equipment. Repair parts and operating supplies for maintenance will be allowed.

Future of Concrete

American Concrete Institute Meeting in Chicago, February 17

IN LINE with Joseph B. Eastman's (director of O.D.T.) request not to hold industry conventions for the duration, the American Concrete Institute cancelled plans for a 3-day convention in Chicago, February 15-17, and instead held a directors' meeting, with a luncheon session, to which prominent local members were invited.

In the absence of the president, Prof. Raymond E. Davis, of California, the incoming president, Prof. Morton O. Whithey, University of Wisconsin, presided. Prof. Whithey, in a short address, reviewed the recent papers and committee reports published in the *Journal* of the Institute, to check as to whether the Institute was fulfilling its avowed functions. He concluded it was; incidentally, there has been quite a growth in membership also.

Prof. Whithey then made presentation of the Institute's medals—the WASON MEDAL for the most meritorious paper of proceedings to Capt. Hugo C. Fischer, U.S.N.; the WASON RESEARCH MEDAL for noteworthy research to M. A. Swayze, director of research, Lone Star Cement Corp.; TURNER GOLD MEDAL "for notable leadership in concrete design and construction for the United States Navy in peace and in war" to Rear Admiral Ben Moreell, U.S.N., chief, Bureau of Yards and Docks.

Each of the recipients was present and made a brief address.

Rear Admiral Moreell said he accepted his medal as a trustee for the thousands of officers and men in the Navy Sea-Bees (Construction Battalions) located now all over the globe, who are doing such herculean work for defense of the United States and all it stands for. He emphasized that none of us who stays at home can ever repay these and our other fighting forces for what they are going through.

Following the election and installation of officers, there was a general round-table discussion of the concrete industry and affairs in general. Frank T. Sheets, president of the Portland Cement Association, said that our biggest post-war job, and one we should be thinking of now, is ways and means to employ the returning service men. He thought that we should and probably will embark on an extensive public improvement program, school houses, hospitals, swimming pools, recreation centers, etc., that the present and coming generation may actually have a better place to enjoy life.

Officers Elected

Officers for the ensuing year were elected as follows: President, M. O. Whithey; vice-presidents, Roy W. Crum, secretary, Highway Research Board, Washington, D. C.; Douglas E. Parsons, chief of masonry construction section, National Bureau of Standards, Washington, D. C.; directors, John R. Nichols, consulting engineer, Boston, Mass.; A. Burton Cohen, consulting engineer, New York City; Fred Hubbard, slag research specialist, Youngstown, Ohio; P. J. Freeman, materials engineer, T.V.A., Knoxville, Tenn.; H. F. Gonnerman, director of the Portland Cement Association laboratory, Chicago, Ill.; T. E. Stanton, materials engineer, California State Highway Department, Sacramento, Calif.; Stanton Walker, director of research, National Sand and Gravel Association, Washington, D. C.

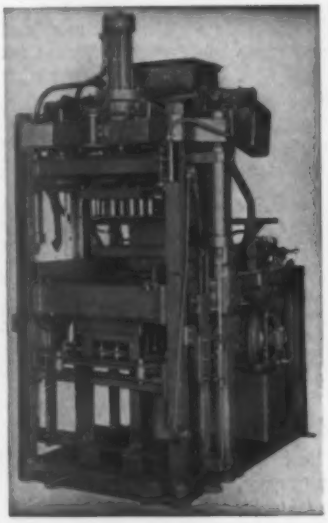
No action was taken at the open meeting regarding future conventions, nor was there any discussion of this subject.

Determining Essential Occupations

REPRESENTATIVES of the non-metallic industries recently conferred with Karl P. Wirth, Occupational Information Unit, U. S. Employment Service, F.S.A., with a view to determining what may be termed "essential occupations." Generally speaking, an occupation is considered essential if it takes six months or more to train a potentially qualified but untrained worker up to a point where he can perform the tasks of the occupation with no more than the normal amount of supervision.

The industries are seeking information on the various essential occupations and the length of training for the job. Each job should be classified into (A) more than two years, (B) one year to two years, and (C) six months to one year.

HYDRAULIC VIBRA-PRESS



A High Production Machine Making Blocks which are Demanded by the Contractor Endorsed by the Architect Desired by the Mason

The KENT MACHINE CO.
CUYAHOGA FALLS, OHIO

"ANCHOR"

Complete

EQUIPMENT AND ENGINEERING SERVICE

Equipment for all phases of manufacturing concrete cinder block and other lightweight aggregate units. Our engineering service for new plants and modernizing old ones will help you operate more economically.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Joltcrete, Stearns mixers, pallets, Straublox Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mchy. Co.
G. M. Friel, Mgr. COLUMBUS, OHIO

Making 20,000 Blocks Per Day

(Continued from page 85)

by-pass chutes. A considerable ground storage of cinders is maintained as a reserve.

Concrete Specialties

In addition to concrete block, the company makes concrete sills, lintels, fence posts, etc. A power saw is employed for the manufacture of ashlar units.

The company has been instructing drivers delivering concrete units to do a selling job in their contacts with customers and prospects. Considerable new business has come from this source. Regular salesmen also are employed to call on realtors, architects, financial institutions, and contractors. This is supplemented with both newspaper and direct mail advertising. Some very large housing projects, shipbuilding construction, and hospital jobs have been obtained from the federal government which have taxed its production facilities at times.

President William H. Ellis is an old-timer in the concrete products business, having started in 1914. His original experience in the block business was obtained as superintendent of a block plant in Norristown, Penn., no longer in operation. Other members of his official family include: George Rittenhouse, secretary; Carl Liptake, operating manager; Mrs. William H. Ellis is office manager and handles all financial details, and Miss Mable Loughin is billing clerk.

Well-equipped machine shop can handle any ordinary maintenance or repair job

Build Chilean Cement Plant

Work is proceeding with the construction of a cement plant at Coquimbo, Chile. This plant, which will have an annual production of 250,000 tons of cement, is being constructed with equipment formerly used in the United States.

Monarch Rejects Union

Employes of the Monarch Cement Co., Humboldt, Kans., rejected representation by the United Lime, Cement and Gypsum Workers International Union, A.F.L., in a recent N.L.R.B. election by a vote of 102 to 64.

"COMMERCIAL"
CORED *Steel* PALLETS

The original heavy gauge, unbreakable cold pressed pallet, that does not require any grinding to fit core box.

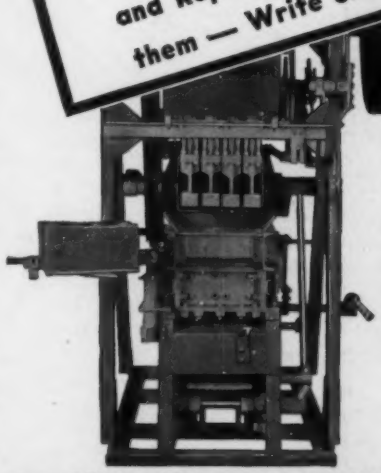
Quality blocks, with sharp edges and mortar grooves, can be made on "Commercial" Pallets. No block loss account of warped, cracked or broken pallets. 70% of the owners of one type of vibrator use "Commercial."

"There's a reason."

Investigate before buying. Our folder, "Here's the Dope," tells why cored pressed steel pallets are the best. Write for it.

The COMMERCIAL SHEARING & STAMPING COMPANY
YOUNGSTOWN, OHIO.

MULTIPLEX machines must keep producing . . Repairs and Replacements if you want them — Write or Wire Today!



Even though we are as busy as can be on war production orders, we are also ready to furnish necessary parts and repairs to keep your MULTIPLEX equipment running smoothly. Just write or wire.

MULTIPLEX CONCRETE MACHINERY COMPANY ELMORE OHIO

Big Gravel Contract

THE ROCK HILL STONE & GRAVEL Co., St. Louis, Mo., operating a sand and gravel plant southeast of Sterling, Kans., through its subsidiary, the Kirkwood Sand & Gravel Co., has just been awarded a contract from the federal government to furnish sand and gravel for a large project in southwest Kansas. H. E. Billman, president of the company, recently purchased a farm on which a large sand and gravel deposit has been found, and a third dredge boat is under construction to excavate the material.

State Opens Limestone Quarry

NORTH CAROLINA has gone into the agricultural limestone business with a new quarry at Limerock, N. C. This quarry was formally opened by Governor Broughton on January 22. The quarry has been owned by the State Highway Department for five years, but it has not been operated in recent years.

Lime Plant Improvement

NYOTEX CHEMICAL Co., Houston, Texas, which recently purchased a local lime plant, has let a contract to William A. Brunet, Houston, for the construction of the main building for a lime and chemical plant. It will be a three-story structure to cost between $50,000 and $100,000. The entire plant will cost about $6,000,000.

Refractory Companies Enjoined

THE FEDERAL TRADE COMMISSION has issued a "cease and desist" order against 39 refractory corporations and their trade institute in a complaint that charged a "conspiracy to fix prices and eliminate competition."

Stone for Air Depot

FRANCE STONE COMPANY'S Bloomville, Ohio, quarry is reported to have the contract to furnish 40,000 tons of stone for the construction of an Army Air Force depot in Ohio. The U. S. Army Engineer Corps is supervising the construction.

Cement Plant Shutdowns

WASHINGTON-IDAHO LIME PRODUCTS Co., had to shut down its Orofino, Idaho, cement plant due to the inability of obtaining raw materials from the quarry. Impassable road conditions on the county road between the Jordan quarry and Orofino made truck hauling impossible, according to Otto C. Frei, general manager. The mill had been on a continuous 24-hour day, seven-day week basis for the last 10 months, except for a 9-day interval when no fuel was available. Production during 1942 ran 207 percent over 1941 tonnage. Operations will be resumed when road conditions improve.

•

NORTH AMERICAN CEMENT Corporation has shut down its Howes Cave, N. Y., plant for an indefinite period as of February 1, 1943. The plant had not operated since the fire in the raw grinding department building in October, 1942. Workmen have been busy putting the raw department in shape for the resumption of operations.

New Mexico Fluorspar

SOUTHWEST of Grants, N. Mex., is a high-grade deposit of fluorspar which is now being crushed in a mill operated on lands owned by Tom Reid, Roswell, N. Mex. Production of finished product is 25 tons a day at Grants. Another mill is being erected at Los Lunas.

Fires

INDEPENDENT GRAVEL Co. reported that part of its plant at White Bear, Mo., near Hannibal was destroyed with a loss estimated at $75,000. This destroyed building was used in making crushed limestone for agricultural purposes, putty powder, filler for rubber, and paint powder. The structure was owned by the Marblehead Lime Co., and had been leased. A new plant, known as the chalk house, was not damaged.

•

WASHINGTON SAND & GRAVEL Co., on Marlboro Pike, two miles from the District of Columbia line, reported a fire loss of $3,000 when its office building was destroyed.

•

JAMES RIVER HYDRATE SUPPLY Co., two miles from Buchanan, Va., reported a fire in its lime plant.

Contract Let for Stone

M. D. R. STONE Co., Albany, Ind., the Muncie Stone and Lime Co., Muncie, Ind., and the J. and K. Company, Fairmount, Ind., have received contracts for stone to be furnished to the county. Each firm bid $1.00 per ton.

Lease Silica Pit

MANLEY BROTHERS, Rockton, Ill., has leased the silica sand pit owned by J. N. Thouvenell, Portage, Wis., which has been in operation for 23 years. This is a foundry sand.

Indiana Stone Contract

LAKE COUNTY, Indiana, will spend $82,250 for crushed stone to repair county roads in 1943. The contract for supplying 35,000 tons of stone at $2.35 a ton was reported to have been let to Material Service Co., Thornton, Ill., quarries.

Liquidating

SILICA SAND Co., Brentwood, Calif., according to local newspapers, quoting Joe Krill, manager, has closed, due to war conditions. Difficulty in obtaining materials and supplies and trying to maintain a working force of forty-odd men was too great. Machinery and equipment are being sold. The plant has been in operation 12 years.

Close City Quarry

THE CITY COMMISSION of Marquette, Mich., has closed the city quarry for the duration in view of wartime restrictions against paving. Crushed rock from the quarry, used for resurfacing streets, cost $4.53 a ton to produce in 1942. The city can buy it on the market for $1.25.

Temporary Shut-Down

COLORADO PORTLAND CEMENT Co., Boettcher, Colo., shut down February 1 with bins full. This plant has been run at maximum capacity for a long time, and advantage will be taken of the shut down to make some very necessary repairs.

Cut Illinois Highway Funds

ILLINOIS highway construction will be cut about one-half this year to a total of $10,455,000 due to war-time restrictions. About $10,000,000 also has been earmarked for highway maintenance. When the war started Illinois was preparing to launch a 10-year program of completely reconstructing old and heavily used highways at an estimated cost of $200,000,000.

A Sheave Like This Will Ruin Wire Rope-

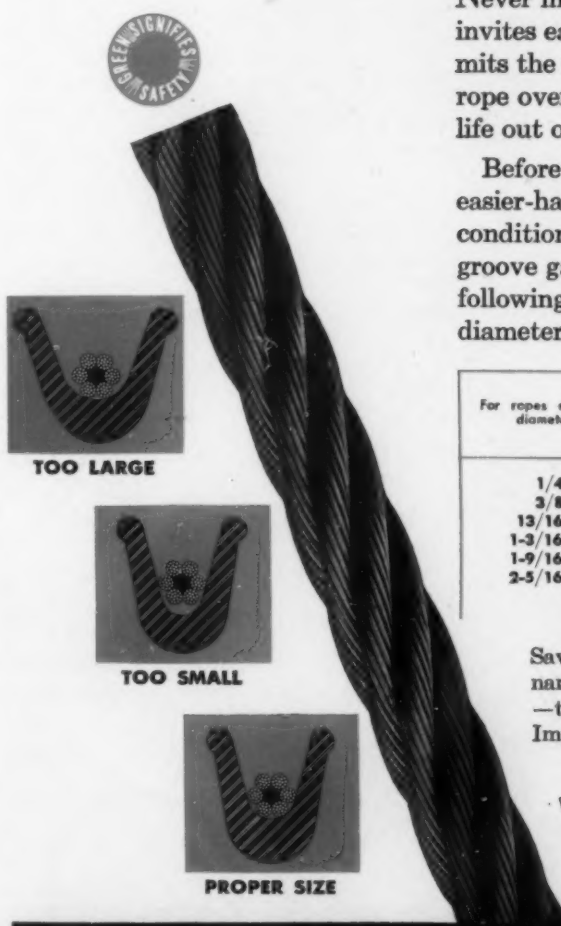
Yes, Even..

HAZARD LAY·SET *Preformed*

Never install a new wire rope on a worn sheave—to do so invites early failure. When the groove gets too wide, it permits the rope to flatten. . . . And don't try to run a new rope over a groove that is too narrow. That pinches the life out of it.

Before installing a wire rope (even the longer-wearing, easier-handling **Hazard LAY-SET Preformed**) carefully check the condition of your sheaves, using the standard sheave groove gauge. For calculating safe groove diameters, the following table gives the exact extent by which the groove diameter should exceed the diameter of the rope:

For ropes of the following diameters in inches	Groove diameter should be greater than rope by not less than the following fraction of an inch	Groove diameter should be greater than rope by not more than the following fraction of an inch
1/4 to 5/16	1/64	1/32
3/8 to 3/4	1/32	1/16
13/16 to 1-1/8	3/64	3/32
1-3/16 to 1-1/2	1/16	1/8
1-9/16 to 2-1/4	3/32	3/16
2-5/16 and larger	1/8	1/4



Save critical steel by careful inspection and proper maintenance of *all* equipment and by using **Hazard LAY-SET Preformed** —the greater dollar value rope. All Hazard ropes made of Improved Plow Steel are identified by the Green Strand.

HAZARD WIRE ROPE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles
New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, INC.

BRIDGEPORT, CONNECTICUT

HAZARD LAY·SET *Preformed* WIRE ROPE

Washington Doings & Regulations

OUR EDITORIAL DESK is constantly snowed under with news releases of W.P.B., O.P.A. and other government war agencies. We are going to pass on to our readers firsthand information in the briefest possible form, with sufficient data that those interested may follow through, if they desire. There are many sources of such information, the local W.P.B. and O.P.A. offices, etc., the daily newspapers, etc. We propose to hit only the high spots of direct interest to our industry.

War Construction

WPB-2591: As a total, direct military construction in December was 16 percent under the November figure and the downward trend continued through January.

War housing and public works construction dropped from $121,671,000 in November to $120,000,000 in December, a decline of 1 percent. Privately financed housing and public works construction showed moderate decreases, while government financed war housing showed a gain of 5 percent.

Activity on government financed industrial expansion, including construction volume and machinery and equipment deliveries combined, which reached a total value of $641,005,000 in November, dropped to $605,458,000 in December, a loss of 6 percent. The volume of factory construction continued downward, being off 12 percent from November, while machinery and equipment deliveries showed a gain of 1 percent. Further increases in machinery and equipment deliveries, and decreases in plant construction, are forecast for the next few months.

Plant construction work done for the Defense Plant Corporation in December was 3 percent less than in the previous month, while machinery and equipment deliveries in this category increased 8 percent. Construction work at Army ordnance plants continued to drop sharply with machinery and equipment deliveries still increasing.

By type of facility, construction decreases occurred in all categories except aircraft. Machinery and equipment deliveries increased at aircraft plants, and at plants manufacturing machinery and machine tools, and other industrial facilities. Notable increases by individual type occurred at synthetic rubber plants, where the construction volume in December was three times as great as in November, and at tank plants and machine tool plants, where machinery and equipment deliveries doubled.

Building Maintenance and Repair

WPB-2603: A revised definition of what constitutes maintenance and repair of a building is contained in an amendment to Conservation Order L-41. The new definition specifically designates that where a single job is partly maintenance and repair and partly new construction, the whole project will be considered new construction and subject to Order L-41.

In addition, the amendment reduces to $200 new construction which may be undertaken, without specific authority, by a number of manufacturing enterprises which are not essential to the war program. Moreover, the amendment applies to private dwellings and commercial structures.

Agricultural construction was exempted from the Order, where the construction is necessary to the installation of material or equipment, the distribution of which is controlled by certain other orders. This exemption is ordered to remove a second unnecessary control on farmers by Order L-41.

Where a structure has been damaged or destroyed by disaster, the order now expressly exempts such construction work as is necessary to protect or make safe the building or its contents. This permits the shoring up of walls of a damaged structure, or other similar work necessary to protect the property, its contents or the public.

An additional exemption is allowed for construction which is necessary to restore or replace residential or multiple residential structures damaged or destroyed by disaster, provided that the estimated cost is less than $5,000. In these cases, Form PD-200 must be filed within two weeks after the damage or destruction occurs.

Cement Bin Ruling

WPB-179 Amended: A clause prohibiting manufacturers of portland cement from assigning storage bins for exclusive use by individual customers has been stricken from regulations. This means that certain restrictions previously applied to the testing of portland cement will no longer be necessary, while specifications for testing remain the same.

Wire Rope Standards

DEPARTMENT OF COMMERCE-3745: A Simplified Practice Recommendation for Wire Rope has been approved for promulgation by the National Bureau of Standards, effective February 15, 1943, and will be identified as R198-43. The program, which lists sizes, constructions, grades and breaking strengths of the vast majority of tonnage of wire rope, was developed by engineers of the wire rope industry, to serve as a wartime conservation measure and as a guide for post-war practice.

Union Maintenance Ruling

"The National War Labor Board, in its basic policies, holds that the Government will not compel a worker to join a union in order to get a job, and that the Government will not use its sanctions during this war to establish or disestablish a union shop.

"By this decision, notice is now given to both workers and management, beyond future misunderstanding or appeal, that no company can take advantage of the Board's standard provision for union security to reduce the provision for maintenance of membership, hereafter also for the so-called interim employees; and that no company can take advantage of the no-strike agreement to throw out a union shop previously established by agreement between the parties. This policy is not intended to interfere with lawfully established bargaining rights."

Quotation is by Dr. Frank P. Graham, public member of N.W.L.B., in majority report in Chicago packing house labor case.

Portable Crusher Sizes

WPB-T-1691: The number of sizes and types of portable jaw crushers and portable roll crushers drastically reduced.

Cement Cars Converted to Oil Use

JOSEPH B. EASTMAN, defense transportation director, announced that 100 freight cars, previously used in cement transportation will be converted immediately to transport at least 12,000,000 gallons of kerosene annually to the New England states.

The cars — low-sided gondolas, each fitted with five large steel tanks —will have a capacity of 8,500 gal. each. They will probably be in operation some time in February between Texas City, Tex., and Chelsea, Mass.

(Continued on page 108)

Koehring Shovels Permit Maximum Output Per Shift

With a Koehring Shovel every move is a productive move. Accurate, speedy swing provides ease in spotting for fast loading. The control is so simple and smoothly working that an operator can keep up top production for a full shift without let down. There need be no waste loading time on your hauling equipment if you are using a Koehring. Koehring features include self-cleaning crawlers—all welded construction—positive steering—fast operating speeds—quiet operation.

KOEHRING COMPANY • *Milwaukee, Wis.*

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

Canadian Wage Problem

(Continued from page 73)

were carried on through the C.I.O. union. The union is now seeking a ruling as to whether the steel workers are entitled to a bonus over and above their new basic wage. They also have been granted the right to have the steel industry in Canada treated as a "national" industry from the viewpoint of wage negotiations. Previously all plants have been treated regionally and their grievances settled by a provincial wage board. The implications of a single national wage structure for the Canadian steel industry are in themselves highly important.

Boon to Unions

Following the considerable success of union organizers in obtaining special consideration for the steelworkers, there has been a country-wide trend towards union membership in both war and peacetime industry. Till now, union organizers have been able to offer their potential membership very little prospect of higher wages. Now the lid seems to be off, although the statutory authority (National War Labor Board) has been reconstituted under a new chairman and every effort will be made to prevent a new crop of wage increases such as would undoubtedly upset the overall price ceiling policy.

Were it not for this disturbing development on the wage front, the managers of Canada's price ceiling policy would be feeling a bit encouraged. They have just succeeded in dropping almost 2 full points off the cost of living index and thus avoiding the payment of a new and additional cost of living bonus to most Canadian wage earners. Such a bonus would seem automatic had the index risen by a full point between October, 1942, and January, 1943. It would have brought further and possibly dangerous pressure on the price ceiling.

Payment of this bonus was only avoided by the entirely new policy announced last December, of deliberately lowering the price of milk, tea, coffee and oranges by means of a government subsidy. The government believes it is cheaper to pay such subsidies (in this case the cost to the treasury is placed at about $40 millions a year) rather than run the risk of putting a new secondary wage-price inflationary cycle in motion.

United States price ceiling policy is being watched with an eagle eye because of the indirect threat which any runaway inflation in the U. S. would have on Canadian policy. Donald Gordon is shortly planning to call on Prentiss Brown in Washington and if the same degree of cooperation can be established as was the case with Leon Henderson there will be more assurance here that the two countries will yet find agreement in working along more or less parallel lines.

War Industries Slowing Up

Canadian war industry is already beginning to foresee the gaunt shape of post-war curtailment with all its complex and ominous implications. Already, because of over-supply and the changing tempo of modern warfare, many British war contracts placed in Canada have been cancelled and thousands of workers have had to be switched from one type of war work to another. There have been reports that a number of U. S. contracts in Canada have also been cancelled and that Canadian firms will have less steel from the U. S. in the second quarter of 1943.

To Canada, this new trend is specially ominous since 70 percent of Canadian war production in 1942 went to either Great Britain or the United States. Canadian manufac-

A REAL TUG OF WAR

Plymouth VS. MATERIALS

This is the kind of gruelling contest that Plymouth Locomotives are built for! Plenty of power, speed to spare, an edge on endurance . . . those characteristics make this a safe bet: Plymouths will pull more materials across the Victory line at lower cost than any comparable method of materials haulage.

Efficient track haulage is an essential cog in war-time production, in peace-time planning. Whatever your job it will pay you to write for facts and figures. We'll cooperate in every way possible.

PLYMOUTH GASOLINE and DIESEL LOCOMOTIVES

PLYMOUTH LOCOMOTIVE WORKS

Division of The Fate-Root-Heath Co. PLYMOUTH, OHIO, U. S. A.

turers fear this country may have a postwar unemployment problem on its hands a year before either Britain or the United States, since the natural tendency in light of increasing raw material shortage will be to keep war industry in both U. S. and U. K. busy in preference to renewing orders in Canada.

"Mutual Aid" Program

That is one reason why Canada attaches especial importance to its new Mutual Aid program announced in February. This program is a modernized and streamlined version of Lend-Lease. It sets aside a billion dollars for the purchase of war materials, food stuffs and raw materials to be distributed to other United Nations on the basis of "strategic need." There are no unknown postwar strings attached to the gift and the chief requirement for distribution will be "effective use" in the common cause.

Canada does reserve the right to require reciprocal benefits if deemed wise or necessary, but the terms under which the supplies and equipment will be distributed will be stated at the time of transfer, so that there will be no postwar "hangover" to be settled at some future date.

Under this Mutual Aid Program, Canada will henceforth distribute surplus war production direct to China, Russia, Britain, Australia, New Zealand, South Africa, and even to the United States. In the past most of our surplus has been distributed by Great Britain because the only mechanism which Canada had for such free distribution was a so-called Billion Dollar Gift—a sum of money voted by the Canadian people for the use of Britain.

Canada was thus in the anomalous position of seeing her tanks, weapons and other supplies which she had donated to Britain, disbursed by that country to other United Nations. It will be of great advantage in many ways, too, for Canada to make this distribution herself direct in the future.

Wartime Conservation

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., East Pittsburgh, Penn., has issued a new booklet of 96 pages which is designed to help users of electrical equipment to secure maximum results with the smallest possible use of critical materials. It is profusely illustrated in color, and contains numerous practical examples to show how greater efficiency may be obtained with existing motors and other electrical apparatus.

Alabama Operations Show Distinctive Equipment Utility and Original Dredge Design . . . . .

Twenty-two years of continuous successful use of Amsco Dredge Pump equipment exemplifies dependable performance. The dredge engineering of today, expressing the economical management of hydraulic sand and gravel plant operations is typified by this producer, in whose equipment "fitness-of-purpose" construction is employed.

The Underwood Walker Company, of Birmingham and Prattville Junction, Alabama, seeking maximum equipment efficiency, has made a new departure in dredge boat design. In 1937 they commissioned a new 10-in. pump size, diesel engine powered plant, a design requiring minimum upkeep attention. The boat is of six steel tank pontoon construction, with all deck and cabin framing, and the engine base setting, of structural steel. The deck, cabin sides and roof are of wood. A novel type of boom assembly, built of structural steel with horizontal beam, the outer end supported by outrigger pontoons, is used for manipulating the plain suction pipe line.

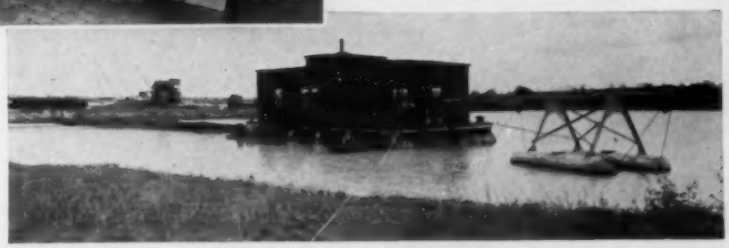
A 10" Amsco, type "M", form 32, heavy duty dredge pump is used for production. It is belt driven by a 150 H.P., 257 R.P.M. diesel engine. The dredge operation works in conjunction with a booster pump, a duplicate of the dredging unit, located on shore conveniently near the screening plant.

The results of many years of practical operation have shown that the entire installation is nicely balanced throughout and affords flexibility over a wide range of field conditions.

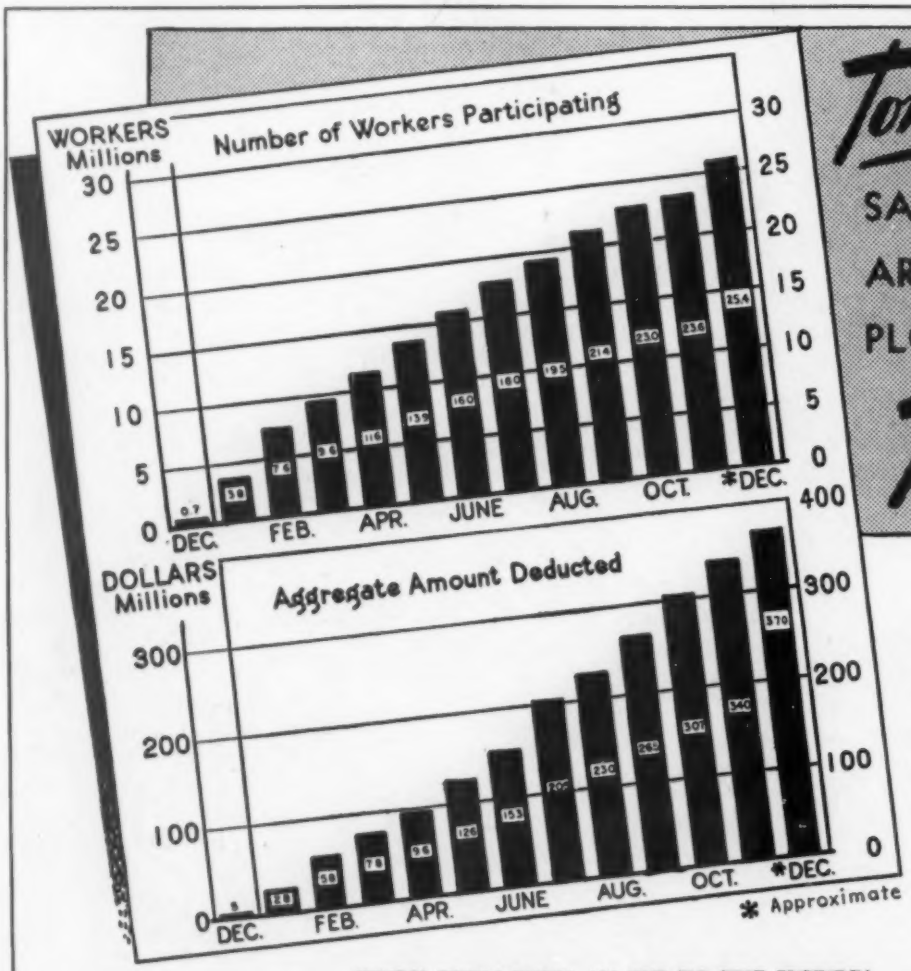
The dredge pump water end parts and all pipe line fittings are made of Amsco impact and abrasion resistant manganese steel, "the toughest steel known."

The composite outline of plant operations illustrates a clear-cut thoroughness of planning and construction; and in particular, the new dredge, under continuous operation, has proved to be most economical.

A bulletin is available completely describing Amsco Dredge Pumps, Rotary Cutters, and Pipe Line Fittings.



Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST LOUIS, MO.
OFFICES IN PRINCIPAL CITIES
THE AMERICAN Brake Shoe AND FOUNDRY COMPANY



Tomorrow's SALES CURVES ARE BEING PLOTTED . . . Today

THESE CHARTS SHOW ESTIMATED PARTICIPATION IN PAYROLL SAVINGS PLANS FOR WAR SAVINGS BONDS (*Members of Armed Forces Included Starting August 1942*)

STUDY THEM WITH AN EYE TO THE FUTURE!

There is more to these charts than meets the eye. Not seen, but clearly projected into the future, is the sales curve of tomorrow. Here is the thrilling story of over 25,000,000 American workers who are today voluntarily saving close to FOUR AND A HALF BILLION DOLLARS per year in War Bonds through the Payroll Savings Plan.

Think what this money will buy in the way of guns and tanks and planes for Victory today—*and mountains of brand new consumer goods tomorrow.* Remember, too, that War Bond money grows in value every year it is saved, until at maturity it returns $4 for every $3 invested!

Here indeed is a solid foundation for the peace-time business that will follow victory. At the same time, it is a real tribute to the voluntary American way of meeting emergencies that has seen us through every crisis in our history.

But there is still more to be done. As our armed forces continue to press the attack in all quarters of the globe, as war costs mount, so must the record of our savings keep pace.

Clearly, on charts like these, tomorrow's Victory —*and tomorrow's sales curves*—are being plotted today by 50,000,000 Americans who now hold WAR BONDS.

EVERYBODY EVERY PAYDAY AT LEAST 10%

Save with

War Savings Bonds

This space is a contribution to America's all-out war effort by

ROCK PRODUCTS

Accuracy In Sampling

(Continued from page 105)

1.5 (when crushing from four to two inches) to 3.0 (when grinding from 65 to 150-mesh). Simply stated, the question is whether the weights for different sizes opposite 2.5 for example, in the "a" column of Table 1, bear the kind of relation to the weights opposite 2.0 that are discussed in the fifth paragraph preceding this, where a distinctly segregated ore is compared with one that is fairly uniform. If such relations do hold, then we are assured that a single, unaltered value of "a" adequately represents the characteristics of a particular ore. As a matter of fact they do hold: at the 1-inch stage in the Table the 2.5 value of "a" calls for 16 times as much ore as does the 2.0 value of "a"; at the ¼-in. stage the ratio is only 8; at 1/16-in. it is but 4; at 1/64-in. it is 2; and finally at 1/256-in. (150-mesh) the weights for the two are the same. That is to say, Table 1 agrees with the natural characteristics of different types of ores, by virtue of which they come to be more and more alike, as to segregation, as they are broken finer and finer.

If a certain value of "a" did not express the sampling peculiarities of a particular type of ore, and a different value express the peculiarities of another type, then there would be just one value of "a" for all ores. In other words there would be only one type of ore instead of the various actual types, differing in their manner of fracture and in the degree of segregation of their valuable minerals. Under any plan that establishes a fixed set-up of "a" for all ores (including the scheme that, for all cases alike, makes "a" to be 1.5 at 4-in., 2.0 at ½-in. and 3.0 at 65-mesh) there is, in place of the progressively changing ratio which is noted in the preceding paragraph, a constant relation. It is the ratio between the separate values of *"k"*. Under such a set-up, if we have one copper ore that calls for 3,000 lb. at one inch, and another for only 200 lb., the weights at 150-mesh are in this same ratio. But we do not find, in actual experience, such a high ratio requirement (15 to 1) for chemical analysis at 150-mesh. The contrasts that were shown between two lead ores, each containing ten percent of lead, but differing in segregation at the coarse stages, make the problem clear. It is evident that the correct weights at 150-mesh are about the same for both ores, but that the weights for the two must be very different at the coarse stages.

EDITOR'S NOTE: In the next and concluding article, the author will discuss the various practical methods of sampling.

(To be continued)

AAA Limestone

AMERICAN LIMESTONE CO., Knoxville, Tenn., will make rail shipments of agricultural limestone to Anderson County, South Carolina farmers under AAA contracts. Shipments will be made to rail destination points, and contracts will be made with individual trucks for delivery to farms. Applications have been taken by AAA for limestone which is available as a grant-of-aid at $2.55 per ton, 5c above last year's price. Last year 3800 tons of limestone were delivered to farmers in the county while 2700 tons ordered were cancelled due to insufficient transportation.

Start Agstone Plant

W. S. BRANTINGHAM of Fayetteville, Ark., has opened up a limestone crushing plant near Foreman, Ark., to fill AAA contracts for Little River County. The new enterprise is known as the Lime Products Co.

Parsons OVAL BAG DUST ARRESTORS
SPEED
FOR TODAY'S PRODUCTION
•••TOMORROW'S Competition
More production is today's battle cry and that's exactly what you get when Parsons Oval Bag Dust Arrestors appear on the job. In every single instance where Parsons Oval bag dust arrestors have been installed, production has immediately been stepped up. Not only that, they afford remarkable protection for employees, equipment and plants. Tomorrow's competition will demand not only speed but economy and efficiency. In hundreds of plants throughout the world Parsons Oval Bag arrestors have been in operation for years, not costing a cent but actually paying for themselves and producing profits. Send for free catalog.
PARSONS
ENGINEERING CORPORATION
CLEVELAND, OHIO

FINANCIAL NOTES

RECENT DIVIDENDS

Basic Refractories	$ .10	Mar. 15
Canada Cement Co., Ltd., 6½% pfd. (p100) (arrears)	1.25	Mar. 20
Canada Crushed Stone Co., Ltd.	.10	Mar. 15
Consolidated Sand & Gravel, Ltd. 7% pfd. (p100) (arrears)	4.00	Mar. 30
Lone Star Cement Corp.	.75	Mar. 31
National Gypsum Co. pfd.	1.12½	Mar. 3
Pennsylvania-Dixie Cement Corp. $7 pfd. A (np) (arrears)	.75	Mar. 15
Pennsylvania Glass Sand Co.	.25	Apr. 1
Pennsylvania Glass Sand Co. 5% pfd.	1.25	Apr. 1
Schumacher Wall Board Corp. pfd.	.50	Feb. 15
Southern Phosphate Corp.	.10	Mar. 31

UNITED STATES GYPSUM CO., Chicago, reports a consolidated net income of $5,652,316 for the fiscal year ended December 31, 1942, as compared with $7,033,629 for a like period in 1941. The balance sheet is as follows:

Assets		
As of Dec. 31	1942	1941
Cash	$ 4,211,248	$ 3,242,956
Marketable secur.	23,403,756	16,429,555
Receivables	8,932,559	10,285,897
Inventories	6,112,426	7,359,992
Total cur. assets	$42,659,989	$37,318,399
Exc. prof. tax cred.	508,000	.....
Invest. & misc. rec.	.....	701,209
Plant & equipment	35,506,394	37,585,332
Deferred charges	1,349,081	1,104,026
Total assets	$80,023,465	$76,708,967
Liabilities		
Accounts payable	$ 1,847,527	$ 2,257,876
Dividends payable	136,888	136,888
Accru. exp. & taxes	1,065,145	1,214,888
Fed. & Canad. taxes	7,839,586	7,436,290
Total cur. liab.	$10,889,146	$11,045,943
Reserves	1,173,478	1,192,508
Preferred stock	*7,882,200	7,822,200
Common stock	†23,935,440	23,927,460
Paid-in surplus	5,831,447	5,831,447
Earned surplus	30,371,753	26,889,409
Total liabilities	$80,023,465	$76,708,967

*Represented by 78,222 shares of 7 per cent cumulative noncallable $100 par value stock.

†Represented by 1,196,772 shares of $20 par value stock.

•

PENNSYLVANIA-DIXIE CEMENT CORP., New York, N. Y., had a net profit of $1,062,479, after charges and taxes, for the year ended December 31, 1942. This compares with a net profit of $1,122,712 for a like period in 1941. Net sales in 1942 were $11,808,105 as against $9,822,271 in 1941.

•

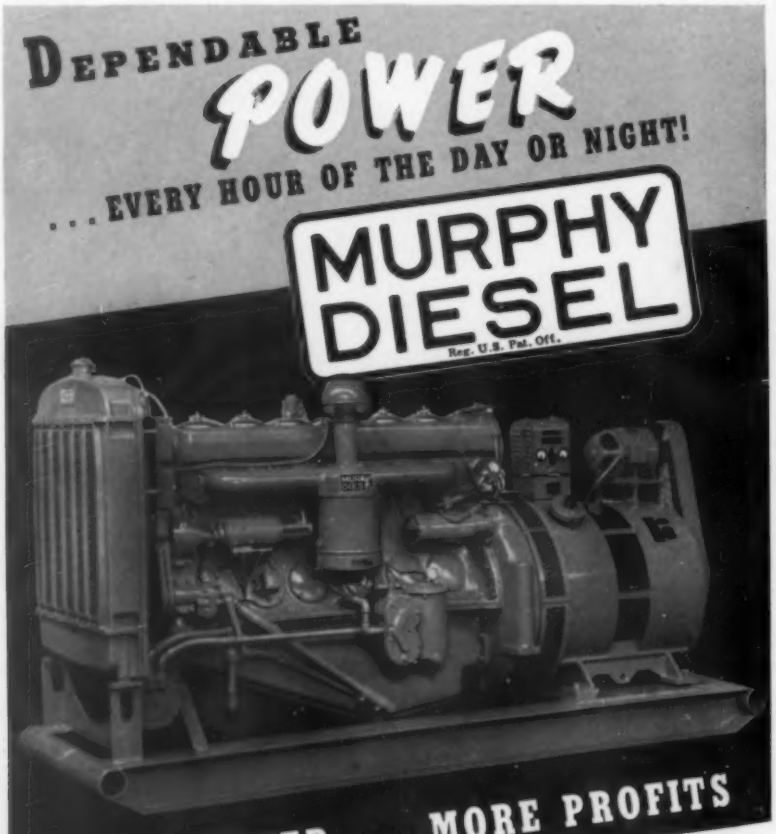
ARUNDEL CORPORATION, Baltimore, Md., had the following income statement for the years ended December 31:

	1942	1941
*Gross income	$14,108,181	$9,495,442
Operating expense	10,216,317	7,034,913
Adm. & gen. exp.	598,543	520,833
Deprec. & deplet'n	481,706	431,447
Operating income	2,811,615	1,508,249
Other income, net	146,180	492,186
Total income	2,957,796	2,000,435
Federal income tax	525,000	550,000
Excess profits tax	1,350,000	.....
Post-war tax refd.	cr 135,000	.....
Conting'cy reserve	.....	500,000
Net income	1,217,796	950,435
Dividends	686,780	693,272
Surplus for year	531,016	257,163
Earned surplus, 1-1	3,198,468	2,705,071
Debits	18,991	172,584
Credits	8,304	†408,818
Earn. surp., 12-31	3,718,798	3,198,468
Earned per share	$2.67	$2.07
No. of shares	455,851	458,850

*Including share of net earnings from joint ventures.

†Includes $348,880 recovery on Everglades District notes written off in 1931 and $59,938 depreciation reserve reduction for prior years to basis proposed by Treasury Department.

Note: No provision made for possible renegotiation of war contracts.



Built for continuous heavy-duty service — rugged, compact, simple to operate — Murphy Diesel Generator Sets provide real operating economy and many years of reliable performance.

Available in sizes 60 to 115 K.W., AC or DC; engines in sizes 90 to 215 HP. Write for complete information.

MURPHY DIESEL COMPANY
MILWAUKEE, WISCONSIN

GIANT PORTLAND CEMENT CO., Philadelphia, Penn., announced a net income of $43,189 for the year ended December 31, 1942, as compared with $43,191 for a similar period in 1941. Net sales for 1942 were $1,439,977 as against $1,486,493 in 1941.

•

PETOSKEY PORTLAND CEMENT CO., Petoskey, Mich., presented the following consolidated income account for the years ended December 31:

	1942	1941
Net sales	$2,041,172	$2,019,640
Cost of sales	1,406,423	1,317,278
Sell., etc., expense	428,460	417,383
*Operating profit	206,289	284,978
Other income	6,325	18,899
Total income	212,614	303,877
Interest	7,018	12,815
Other deductions	.....	1,823
Income taxes	73,069	87,161
Excess profits tax	.....	9,775
Net profit	†132,527	192,304
Dividends (cash)	75,000	75,000
Surplus for year	57,527	117,304
Earned surplus, 1-1	590,787	973,483
Stock dividends	.....	500,000
Credits	12,413	.....
Earn. surplus, 12-31	660,727	590,787
Earned per share	$0.53	$0.77
No. of shares	250,000	249,295

*After depreciation and depletion: 1942, $125,589; 1941, $119,622.

†Due to change in method of valuing inventories net profit decreased approximately $18,000.

•

LAWRENCE PORTLAND CEMENT CO., New York, N. Y., had the following income account for the years ended December 31:

	1942	1941
Net sales	$3,595,496	$3,385,470
Cost of sales	2,816,111	2,436,636
Sell., etc., expense	447,349	450,043
Deprec. & depletion	260,682	260,742
Operating profit	71,354	238,049
Other income	25,293	26,549
Total income	96,647	264,598
Income taxes	21,500	80,000
Net income	75,147	184,598
Dividends	37,500	75,000
Surplus for year	37,647	109,598
Earned surplus, 1-1	419,259	309,661
Earned surp., 12-31	456,906	419,259
Earned per share	$1.00	$2.46
No. of shares	75,000	75,000

Iowa Agstone Contracts Let

CONTRACTS for the sale and delivery of agricultural limestone for Dubuque County have been announced by Louis Walsh, chairman of the Agricultural Conservation Association, Dubuque, Iowa.

THE DUBUQUE STONE PRODUCTS CO., Dubuque, Iowa, was a successful bidder in the following townships with the prices given. The first price is delivery to farm, the second price is delivery and spreading.

Dubuque: $1.70; $2.20. Peru: $1.95; $2.45. Mosalem: $1.95; $2.45. Table Mound: $1.85; $2.35. Jefferson: $2.05; $2.55. Concord: $2.20; $2.70. Liberty: $2.40; $2.90. Vernon: $1.95; $2.40. Washington: $1.90; $2.40. Prairie Creek: delivered and spread $2.50. Center, delivered to farm, $1.75.

THE V. E. DZABOFF LIME WORKS were successful in Cascade, $1.60; $2.30. Taylor, $1.60; $2.30. Whitewater, $1.60; $2.30. Dodge, $1.60; $2.30. Prairie Creek, delivered to farm, $1.80.

PETER J. WINTERS was successful in Iowa: $1.75; $2.00. Center: $1.75; $2.00.

W. B. TEGELER was low in New Wine, with a price of $2.35 delivered to farm.

H. C. SCHNOBELEN was low in the price of delivery and spreading in New Wine with a price also of $2.35.

Low bidders with ton prices f.o.b. the stock pile were Dubuque Stone Products Company, Dubuque, $1.00; Dzaboff Lime Works, Cascade Township, $1.20; and M. F. Simons, Farley, $1.40.

Sand Bags for War Use

IN CLEVELAND, OHIO, the police department is arranging to fill 40,000 bags with sand, each bag holding about 100 lb. The bags will be distributed to police and fire stations for local distribution to residents as an air raid precaution.

Buy Mine

R. G. LASSITER, well-known stone producer, and associates have purchased the Silver Valley Mining Co., Lexington, N. C., through the Virginia Rock and Zinc Corporation. It is planned to develop a zinc mine.

This trowel had thirty lives!

Even after shaping 30,000 feet of concrete pipe, the surface wear it showed was within permissible tolerance!

EMPLOYED FOR SHAPING the bell-end of machine-made concrete pipe, this revolving trowel had to continuously withstand the grueling abrasion of crushed stone, sharp sand, and cement aggregate. A terrific punishment! Neither Swedish steel nor hardened tool steel could take it! Even a trowel cast of alloy steel quickly succumbed so that costly replacement became necessary every 800 feet.

Finally, Coast Metals Hard-Facing was tried. The trowel was made of a low carbon steel, cast undersize and then built up to dimensions with an exceptionally wear-resistant Coast Metals Coating. The results proved outstanding! Over thirty times the best service previously obtained!

Why not try Coast Metals Hard-Facing in solving *your* wear-resistance problem?

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
Executive Offices: New York, N.Y.

COAST METALS
hard-facing weld rods

YOUR EQUIPMENT'S LIFE PRESERVER AGAINST WEAR

Alloy Steel Repair Parts

(Continued from page 100)

WPB-T-1639: The use of alloy steel in angledozers or trailbuilders, in bulldozers, and in repair parts for both of these construction equipment items, is prohibited by Limitation Order L-217, Schedules III and IV. Power control units, prime movers, and anti-friction bearings are exempted from the denial of the use of alloy steel in both Schedule III, covering tractor-mounted angledozers or trailbuilders, and Schedule IV, covering tractor-mounted bulldozers. Producers may also use such alloy steel as is in inventory or in transit to them on February 1.

Truck Rationing Releases

WPB-2566: Since the rationing program became effective March 9, 1942, a total of 104,666 vehicles of all types has been released to civilian users and holders of government exemption permits. This total includes 23,290 light, 55,460 medium, and 13,146 heavy trucks; 7,601 trailers, and 5,169 miscellaneous vehicles.

Reopen Pipe Plant

WALLA WALLA CONCRETE PIPE CO., Walla Walla, Wash., has resumed operations in a new plant which replaced the one which was destroyed by fire in November last year. Concrete masonry was used in the new building. More room is available, and all operations have been made more efficient. The new plant represents an investment of $15,000.

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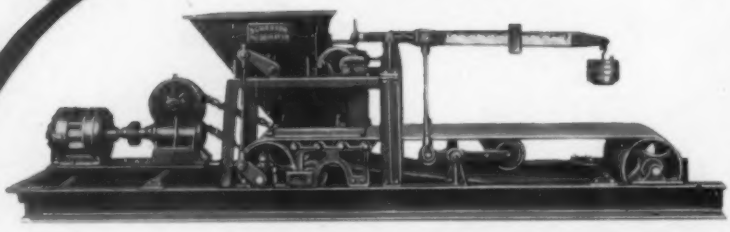

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Open-Top Car Shortage Predicted

THE OFFICE OF DEFENSE TRANSPORTATION has warned that serious delays in the movement and delivery of bulk commodities by rail threaten to occur during 1943 as the result of tight situations in the supply of open-top freight cars and railroad motive power. Such stringencies, the O.D.T. said, are likely to appear more frequently, and be of longer duration, this year than in 1942.

More severe car and locomotive stringencies are expected to develop, O.D.T. officials said, partly because of increases in the volume of freight moving in open-top cars and in the distances it must be hauled and partly because of other factors affecting the motive-power and car-supply situation. Considerably more than half of all freight moved by the railroads is carried in open-top cars.

Loadings and tonnage of most commodities moving in open-top cars are expected to rise in 1943. The only substantial decline anticipated is in sand, gravel, and stone, reflecting the near-completion of war construction programs. But that decline is more than offset by estimated increases in coal movements alone. Material increases are expected also in loadings of iron ore and iron and steel manufactures.

The O.D.T. asserted that various efforts were being made to alleviate threatened car and motive-power stringencies. Steps taken to bring about heavier loading of freight cars, to reduce empty-car movements and excess hauling, and to spread out seasonal movements of such commodities as coal, were mentioned in this connection.

Freight Rate Hearing Temporarily Deferred

ILLINOIS COMMERCE COMMISSION has deferred indefinitely a hearing called on its own motion to investigate the rates on sand, crushed stone and gravel shipped by rail from various Illinois points to Illiopolis, Ill. A petition had been filed on behalf of a crushed stone producer asking for the establishment of the same rate from its quarry as is in effect from other quarries.

Application of 3 Percent Transportation Tax to Price

W. Vernon Brumbaugh, secretary of the National Lime Association, has obtained and sent to the member companies, a statement from the OPA which sheds considerable light on the application of transportation charges to ceiling prices of lime. This statement is of very general interest to rock products producers and manufacturers who usually sell on both f.o.b. and delivered prices.

Supplementary Order No. 31 explains the method of determining the applicable maximum price of any commodity when the 3 percent Federal tax on freight is invoked and states that the amount of the tax for the purpose of determining a maximum price shall be considered as a transportation cost rather than a tax.

In applying the provisions of this regulation to the lime industry the following rules of interpretation will be helpful.

Lime Sold on an F.O.B. Plant Basis

If the seller sold f.o.b. plant in March, 1942, increases in outbound transportation costs (including the 3 percent tax) can, of course, be passed on to the purchaser.

Lime Sold on a Zone Delivered Price with Full Freight Allowed

In those instances where lime is priced and sold on a zone delivered price basis with full freight allowed, the seller must absorb any increases in the cost of transportation whether the cost results from a tax or from some other cause.

Lime Sold on "Delivered Price" for Convenience of Seller or Purchaser

If the seller sold on a delivered price basis in March but his price was computed on the basis of an f.o.b. plant price, adjusted for the actual cost of making delivery to each individual customer, the seller may pass on increases in transportation costs. However, this method of computing the March delivered price must have been objectively established to purchasers, as where the sellers offered both a delivered and f.o.b. price, the difference being the transportation costs; or where the seller quoted or billed transportation costs separately; or where the delivered price varied in each locality precisely by the difference in costs of transportation to the several localities.

Lime Sold on "Delivered Price" to Meet Competition

If the seller sold on a delivered price basis in March but his price was computed on the basis of an f.o.b. plant price, adjusted for the competitive cost of making delivery to each individual customer, the seller may pass on increases only on the actual competitive transportation costs used to compute the delivered price.

In other words, the seller must absorb the transportation tax on the difference in transportation costs between the actual and competitive rates, for example:

50 tons lime @ $8.00 per ton	$400.00
Actual freight rate, $2.00 per ton	100.00
Competitive freight rate, $1.50 per ton	75.00
Difference in freight rates	25.00
Tax to be absorbed by shipper would amount to 3 percent on the difference in freight rates, or	.75

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EAGLE Machines for processing Sand and Gravel can be relied upon for maximum production in supplying these essential materials for defense construction work.
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Owner Truck Drivers and the Transportation Tax

V. P. AHEARN, executive secretary, National Sand and Gravel Association and National Ready Mixed Concrete Association, informed member companies on February 9 that there are still several unsettled points about the application of the 3 percent tax on transportation of personal property. There was a discussion of this at the recent Cleveland meeting, reported on pp. 46 and 86, ROCK PRODUCTS, February issue. A paragraph was added to the convention report containing a later communication from Mr. Ahearn to the effect that the matter of owner truck drivers had been settled, pending a decision of the U. S. District Court in the case of the Grand Rapids (Mich.) Gravel Co.

Since the Internal Revenue Bureau of the Treasury Department rules that owner drivers *are employes* of the employing producers, for the purpose of collecting the social security tax, they are also employes as regards the application of the 3 percent transportation tax. In other words, no tax is collected. Previously, the Internal Revenue Bureau classified them in one case as employes, and in the other as transportation contractors. The pending U. S. Circuit Court decision will decide which they really are.

Producers are urged to read the Internal Revenue Bureau Regulations entire (*Federal Register*, February 3), which are rather long and complicated. Mr. Ahearn's own comments on them are as follows:

"1. The regulations fail to mention, or discuss only incompletely, certain phases of the 3 percent property transportation tax with which our industry must be concerned. It will be seen that (paragraph 143.1 (d)) the tax applies to accessorial services furnished in connection with the transportation movement, including loading, unloading, demurrage, lighterage, trimming of cargo in vessels, wharfage, and handling.

"2. It is not clear from the regulations as to whether the tax applies to the intra-operation movement of property. Paragraph 143.13(b) provides that the tax shall not attach

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The working mechanism of the Model 51 crawler traction drill is likewise made to take rough service. Shafts and anti-friction bearings are oversized. The length and character of the stroke are adjustable to give greatest efficiency.

You can be sure of getting a superior piece of equipment that will give you dependable performance for years if you select a KEYSTONE Blast Hole Drill.

You will want to know more about it.

Write for Bulletin BD-1141.

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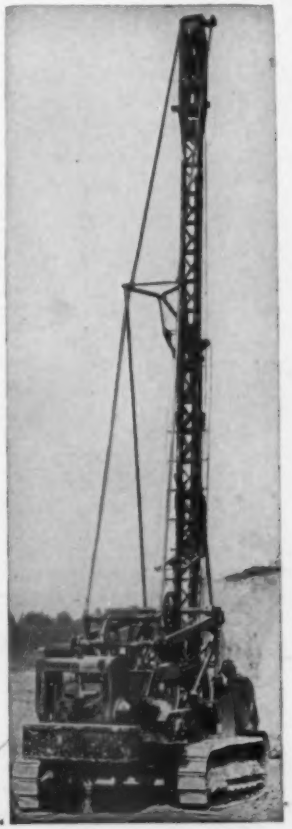

to the transportation of 'unprepared coal from the mine to a preparation plant, including a breaker, washery, or tipple.' This suggests a principle that the tax applies only to the transportation for hire of finally processed goods, but it seems necessary for the Association to get a specific clarification of the Bureau's policy, and this will be requested.

"3. It is worthy of additional emphasis that the 3 percent tax does not apply when a member of our industry transports his own materials in his own trucks or other transportation equipment. This is so, even though our customer pays an additional charge for the transportation.

"4. The regulations are silent on the question of application of the tax in respect to leased equipment. Presumably the Internal Revenue Bureau continues to adhere to the position which we have outlined in earlier reports to member companies, namely that, if a member of our industry leases motor vehicles or water transportation equipment from another member of the industry, the tax applies to the amounts paid for such lease if the services of an operator employed by the lessor are furnished with the transportation facilities. It was expected that the regulations would take a formal position on the point of leased equipment, but since they failed to do so, the Association is preparing to request a formal ruling from the Bureau, and an immediate report to member companies will be made whenever that formal ruling is received."

Stone Business at Peak

THE FEDERAL MATERIALS CO., Cape Girardeau, Mo., has been working at peak capacity for the entire year. Production of commercial stone jumped 50 percent, and 200,000 tons were shipped during 1942.

Open Oregon Quarry

A QUARRY is being opened by Los Angeles, Calif., interests about half way between Myrtle Point, Ore., and Coquille. Interested parties are said to be John C. Fryer and Hal Clark, with Pat Collier of Coquille as the local representative.

City to Close Quarry

ST. JOSEPH, MO., is reported to have decided that it would shut down its quarry due to lack of man power and difficulty of obtaining machinery, according to Andrew Branum of the Board of Public Works.

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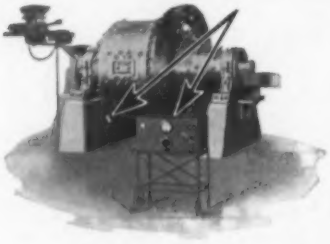

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The "Electric Ear" controls the mill feeder by sound. The sound varies with feed size, hardness, moisture and inadvertent changes in normal feed rate.

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Takes Over Phosphate Recovery Corporation

MINERALS SEPARATION NORTH AMERICAN CORP., has announced that it has acquired the business and assets of Phosphate Recovery Corporation. Activities heretofore engaged in by the Phosphate Recovery Corporation will be continued by the Minerals Separation company at 11 Broadway, New York, N. Y., and from the laboratories at Lakeland, Fla., and Hibbing, Minn.

New Sheetrock Siding

UNITED STATES GYPSUM CO., Chicago, Ill., has developed a gypsum board called Triple-Sealed Sheetrock Siding which it is claimed will cut the cost of duration buildings up to 30 percent. The board is made one inch thick, 2 ft. wide and 6, 8, 9, and 10 ft. long. It is designed to use on standard construction and therefore requires no special construction features. The unit "builds, sheathes, sides, braces and decorates, in one operation."

WPB Estimates Cement Needs

ACCORDING to a preliminary forecast made by the War Production Board, the cement requirements for construction purposes in continental United States will total approximately 108,000,000 bbl. in 1943. It is estimated that consumption in the first quarter will total about 32,000,000 bbl., in the second quarter about 36,000,000 bbl., in the third quarter approximately 24,000,000 bbl., and in the last quarter something under 16,000,000 bbl.

Minute Man Flag to Quarry

CONSOLIDATED QUARRIES CORP., Decatur, Ga., now flies the Minute Man flag with the T award for having at least 90 percent of all employes subscribing 10 per cent or more of their earnings for the purchase of United States War Bonds.

Celebrates 50th Anniversary

THE MANHATTAN RUBBER MFG. DIVISION of Raybestos-Manhattan, Inc., Passaic, N. J., will celebrate its fiftieth anniversary this year. The original company was incorporated on October 28, 1893, during the panic which lasted from 1893 to 1897. Two of Manhattan's early executives and several employes have been with the company for more than 45 years. These officials are F. L. Curtis, vice-president and treasurer, who was manager of the company's original factory office, and C. T. Young, factory manager, who was assistant to Mr. Curtis in the early factory office. Another early employe is C. E. Cummings, present assistant secretary.

Mineral Wool Meeting

AT THE RECENT annual meeting of the National Mineral Wool Association in Cleveland, Ohio, the following were elected officers for the ensuing year: President, L. N. Cassidy, Johns-Manville Sales Corp.; vice-president, H. E. Carney, Jr., and Carney Rockwool Co.; treasurer, American Rock Wool Corp. New directors are M. L. Kuykendall, Insulation Industries, Inc., and T. C. Carter, Eagle-Picher Sales Corp.

W.P.B. Cement Committee

MEMBERS of the W.P.B. Industry Advisory Committee on portland cement are: W. A. Wecker, Marquette Cement Mfg. Co., Chicago, Ill.; Coy Burnett, Monolith Portland Cement Co., Los Angeles, Calif.; G. H. Reiter, Universal Atlas Cement Co., New York, N. Y.; F. M. Coogan, Alpha Portland Cement Co., Easton, Penn.; H. O. Warner, Colorado Portland Cement Co., Denver, Colo.; J. F. Neylan, Lone Star Cement Corp., New York, N. Y.; Frank E. Tyler, Dewey Portland Cement Co., Kansas City, Mo.; E. S. Gubernator, Lehigh Portland Cement Co., Allentown, Penn.; D. S. Browder, Pennsylvania-Dixie Cement Corp., New York, N. Y.; Geo. W. Cole, Medusa Portland Cement Co., Cleveland, Ohio; J. B. Johnson, Trinity Portland Cement Co., Chicago, Ill.; Frank A. Sweeney, National Portland Cement Co., New York, N. Y.

Sand-Lime Brick Production and Shipments

FOUR active sand-lime block and brick plants reported for January and four for December, statistics for which were published in February, 1943.

AVERAGE PRICE FOR JANUARY

	Plant Price	Delivered Price
Detroit, Mich.	....	$16.00
Saginaw, Mich.	$13.00	....
Grand Rapids, Mich.	....	15.00
Seattle, Wash.	16.50	18.50

STATISTIC FOR DECEMBER AND JANUARY

	*Dec.	†Jan.
Production	728,000	342,000
Shipments (rail)	60,000	.....
Shipments (truck)	483,825	381,000
Stock on hand	655,280	610,280
Unfilled orders	1,550,000	530,000

*Four plants reporting: incomplete, one not reporting stock on hand and two not reporting unfilled orders.

†Four plants reporting: incomplete, one not reporting stock on hand and two not reporting unfilled orders.

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★ ROCK CRUSHERS ★

STATIONARY or MOBILE for Military Highways, Access Roads, Army and Navy Air Base Construction

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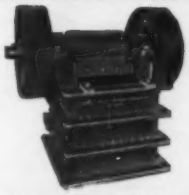

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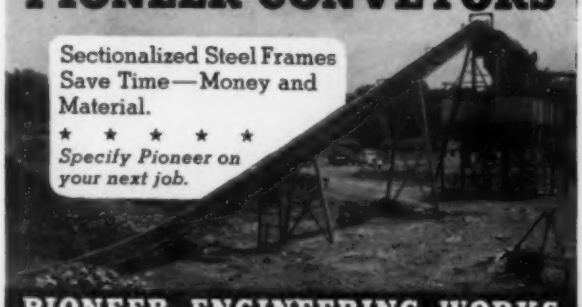

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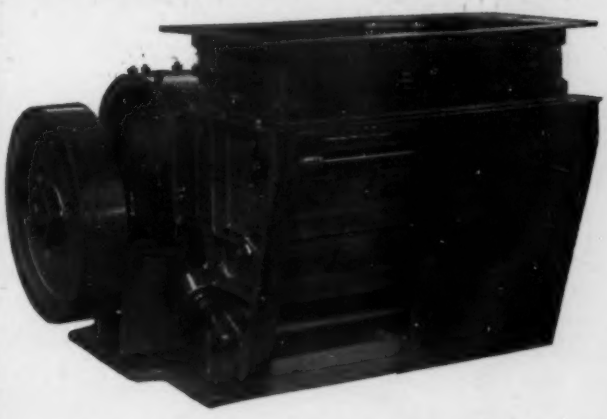

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AMERICANS are powerful, ruggedly built, simple in design, for all-around superior performance.

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OBITUARIES

LELAND DALE MORTENSEN, general superintendent, Utah Sand and Gravel Products Corp., Salt Lake City, Utah, died recently at the age of 52. Mr. Mortensen was widely known in the West for his supervision of heavy construction jobs in Utah, California, Nevada and Wyoming, and directed construction of the first mile-long concrete runway at the Salt Lake airport in 1937. He was recently elected a director of the company, with which he became associated in 1918. He also acted as a director of the Stauffer Sand and Gravel Co., an affiliated unit.

•

OTTO W. LANGE, president of the National Sand Co., Chicago, Ill., and vice-president of the Indiana Core Sand Co., passed away recently at the age of 72.

•

JOHN T. HEFFERNAN, JR., general manager, Glacier Gravel Co., Seattle, Wash., died recently at the age of 43, after a short illness. Mr. Heffernan, prior to his affiliation with the Glacier Gravel Co., had been associated with his late father in the sand and gravel business.

C. H. KRAUSE, vice-president and treasurer, Columbia Quarry Co., St. Louis, Mo., passed away recently at the age of 69. Dr. Krause had been connected with the company since it was organized in 1906. Originally a physician, Dr. Krause was a brother of E. J. Krause, past-president of the National Crushed Stone Association. The two brothers were associated in business practically all their lives. The doctor, however, was less widely known in the stone business.

•

FRANCIS WINTHROP WHITE, retired cement company executive of New York, died recently at the age of 82. A graduate of Harvard University, Mr. White began work in New York with the Warren Scharf Asphalt Co. in 1887. Later he was with the Warren Burnham Cement Co., the Virginia Portland Cement Co. and the Colloseus Cement Co., all later merged with the Atlas Portland Cement Co., now the Universal Atlas Cement Co. He retired in 1920.

•

HARVEY C. ADAMS, founder of The Waylite Co., Chicago, Ill., died recently at the age of 72. Mr. Adams for many years was engaged in the manufacture of clay brick in Danville, Ill., the center of an important brick-manufacturing region. In the early 1930's he became interested in a process developed in Germany for the production of an expanded lightweight concrete aggregate through the dry-granulation of molten slag as it is discharged from the blast furnace. After several years of pioneering work, Mr. Adams succeeded in establishing his product and plants are now in operation in Illinois, Indiana, Alabama, and Pennsylvania.

•

JOHN HARDER WAGONER, superintendent and engineer for Eastern Rock Products, Inc., Boonville, N. Y., died recently of a heart attack at the age of 60. He was stricken while waiting for help in extricating his sedan which was stalled in the snow. Mr. Wagoner was educated in New York City and the University of Pennsylvania. He had been associated with Eastern Rock Products, Inc., for 23 years. He was also vice-president and chief engineer of Corkturf, Inc., Utica, N. Y.

•

ADOLPH JOHNSON, president and treasurer, Anchor Stone Co., Minneapolis, Minn., died recently at the age of 87. Mr. Johnson had been engaged in the stone and cement business for more than 50 years.

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centrifugal SAND PUMPS

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Save Pumping Cost

Continuous operation without attention for long periods. Stuffing box, stuffing, gland water ALL eliminated. Close clearances maintained by easy slippage seal adjustment. Heavy pumping parts of material best suited for YOUR particular problem. Complete engineering service. Prompt shipment of parts. The most efficient and economical pump you can buy. *Write for Complete Catalog*

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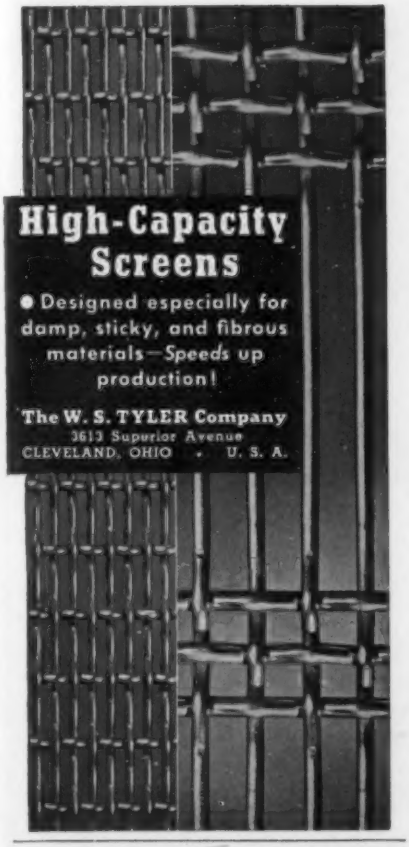
Mexico, D. F., Edificio "Jalisco


High-Capacity Screens
● Designed especially for damp, sticky, and fibrous materials—Speeds up production!
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CRUSHERS
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Engineering Service

EARLE C. BACON, Inc.
17 John St., New York, N. Y.

SAMUEL G. WHITEHEAD, pioneer sand producer and retired officer of Whitehead Bros. Co., New York, N. Y., died at his home in Selkirk, N. Y., recently at the age of 71. Born in South River, N. J., July 18, 1871, of the family which founded the sand business known as Whitehead Bros. Co., he moved to Selkirk with his father, the late Samuel Whitehead of Castleton, and established the business at several points along the Hudson River and Erie Canal.

•

H. H. VAUGHAN, president and consulting engineer for The Canadian Foreign Investment Corp., Ltd., Montreal, Canada, which owns the Companhia Brasileira de Cimento Portland, Sao Paulo, Brazil, passed away recently.

•

HAL S. COVERT, formerly secretary of the Southern States Lime Corp., Crab Orchard, Tenn., died recently in Knoxville, Tenn. He was widely known in the lime industry, and particularly in the South, where he was employed first by the Knoxville Sand and Lime Co., and later as secretary of the Lime Manufacturers of Districts 4, 10 and 11.

•

THOMAS MATTHEW SMILEY, SR., head of the Smiley Sand and Gravel Co., Atlanta, Ga., passed away recently at the age of 82. Born in Shelbyville, Tenn., Mr. Smiley moved to Rome, Ga., in 1899. In 1907 he became head of the Smiley Sand and Gravel Co. there, coming to Atlanta six years later.

•

RAY M. RAFF, secretary-treasurer of the Diamond Portland Cement Co., Massillon, Ohio, until his retirement a year ago, passed away recently at the age of 68. Mr. Raff had been associated with the cement company for 26 years and was a director at the time of his death.

•

ANDREW GILBERT CROLL, vice-president of the Universal Atlas Cement Co., New York, N. Y., until his retirement in 1930, died recently at the age of 70. Mr. Croll joined the cement company as a mechanical engineer in 1900, five years after his graduation from Cornell University. After his retirement he continued as a consulting engineer for various cement companies.

•

EMORY LEYDEN FORD, president of the Michigan Alkali Co., Detroit, Mich., passed away recently at the age of 66. Mr. Ford also was president of the J. B. Ford Co. and a vice-president of the Huron Portland Cement Co.

TALCOTT BELT FASTENERS
for Splicing and Patching Conveyor Elevator and Transmission Belts

Only a Hammer Needed to Apply Talcott Fasteners
Write for Information
W. O. & M. W. Talcott, Inc.
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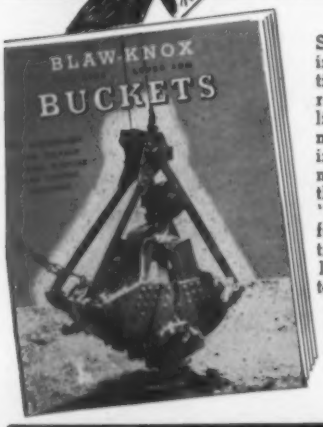
BLINDING TROUBLE ?
A SECO screen will handle the material that may be plugging your present screens.
There is less blinding on a SECO than with any other type of vibrating screen.
And absence of blinding means greater efficiency and greater capacity.
May we send you a catalog?
Screen Equipment Co.

BLAW-KNOX BUCKETS have SEALED BALL BEARING SHEAVES



Sealed ball bearing sheaves in the lever arm reduce lost time and expense of bearing replacement, increase cable life and reduce friction, materially improving operating efficiency. This, and many other better features, that make BLAW-KNOX the "wise" buy in buckets are fully explained and illustrated in NEW CATALOG 1757. Send for your copy today.

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BLAW-KNOX BINS AND BATCHERS • ROAD FORMS • STREET FORMS • CONCRETE SPREADERS • TAMPING ROLLERS • VIBRATORS
CONCRETE BUCKETS • CLAMSHELL BUCKETS • TRUCK MIXERS • STRIKING MACHINES • TIGHTENERS • ROAD FINISHERS • STEEL FORMS

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Starts with the Plate, Itself

For particularly severe screening jobs, Hendrick Perforated Plate, made from high-carbon, heat treated steel, possesses the hardness and toughness so essential in screening abrasive materials. Hendrick Perforated Plate is available with any desired shape or size of opening—round, square, hexagonal, slotted, or Squaround. It can be had flat, or rolled to any curvature; corrugated, or doubly-corrugated. Write for complete information.

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Makers of Elevator Buckets of all types. Mitco Open Steel Flooring. Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

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ready to "go on the line" in a new Cement plant designed for top efficiency in every Department.

- Major crushing by smashing impact
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are some of the outstanding advantages which this REVERSIBLE Hammermill will provide in the Secondary Preparation for modern Raw Side Grinding Mills.

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A FOOL-PROOF TAGLINE

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearing and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

Manufactured by
McCaffrey-Ruddock Tagline Corp.
2121 E. 25th St., Los Angeles

Obituaries

(Continued from page 115)

ANDREW L. HALLEMAN, president and treasurer, Templeton Lime Co., Chicago, Ill., died of a heart ailment recently at the age of 63.

•

JOHN BINGHAM, quarry superintendent, Michigan Alkali Co., Alpena, Mich., passed away recently. Mr. Bingham had been associated with the company for the past 35 years. He is succeeded by William Hagen who has also been with the company for a number of years. The Michigan Alkali Co. is an affiliate of the Wyandotte Portland Cement Co.

•

WILLIAM D. GOBLE, traffic manager, National Lime and Stone Co., Findlay, Ohio, passed away recently at the age of 58.

•

WARNER R. THOMPSON, president, Warner R. Thompson Co., Detroit, Mich., died recently at the age of 78, following a long illness. Mr. Thompson began his active career as a messenger boy for the Western Union Telegraph Co. in 1878. In 1914 he established his own company, which he operated until the time of his death. He was also president of the Burt Core Sand Co.

•

EDWARD W. KAMMER, retired road contractor and president of the Keystone Gravel Co., Dayton, Ohio, died recently at the age of 63. He established a road contracting business with his brother, the late Abner Kammer, in 1910. In 1920 he founded the Keystone Gravel Co. He was president and general manager of the company. Mr. Kammer retired in 1935 from the road contracting business and his son, Ralph, now runs it. Last year he retired from active participation in the Keystone Gravel Co., but still retained the presidency.

•

FRANK B. TAYLOR, president, Taylor Concrete Products, Inc., East Hounsfield, N. Y., passed away recently at the age of 70. He was born in March, 1872, on a farm in the town of Watertown, N. Y. In early life Mr. Taylor followed the occupation of a farmer but later, for about 25 years, he was a salesman of road machinery and other highway equipment. In 1927 he and his son, Leland F. Taylor, organized the F. B. Taylor and Son Co. and started in the business of distributing highway equipment. Becoming northern New York pioneers in that line of business, they also began the manufacture of concrete culvert pipe and concrete guard posts. In 1932 they further expanded their business by developing a ready mixed concrete business. The Taylor company was incorporated in 1932 with the father as president. With its incorporation, the business became Taylor Concrete Products, Inc.

•

SOREN TERMANSON, quarry owner of Sturgeon Bay, Wis., passed away recently at the age of 81.

•

GEORGE H. RICHARDSON, superintendent, Standard Slag Co., Ironton, Ohio, passed away recently at the age of 64. Mr. Richardson was a native of Michigan but had resided in Ironton since 1915, when he became superintendent in charge of plants in Ironton, Jackson, Ashland and Portsmouth.

•

WILLIAM H. WHITE, former assistant superintendent of the Howes Cave plant of the North American Cement Co., formerly the Helderberg Cement Co., Howes Cave, N. Y., died recently at the age of 72. Mr. White was associated with the cement company for 28 years, during which time he served in several capacities, retiring about 15 years ago. For the past six years he was mayor of the Village of Cobleskill, N. Y.

PULVERIZERS for the reduction of Cement Materials, Limestone, **Agricultural Limestone,** Fire Clay and All Dry, Refractory Materials.

Capacities: 1 to 60 tons per hour — Finenesses: 20 to 350 mesh

BRADLEY PULVERIZER CO.

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To Increase Capacities or Fineness of Present Grinding Plant—
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THE ROSS FEEDER

Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

High in efficiency. Low in maintenance and power consumption.

Furnished in sizes to suit your operation. Send full particulars for recommendation.

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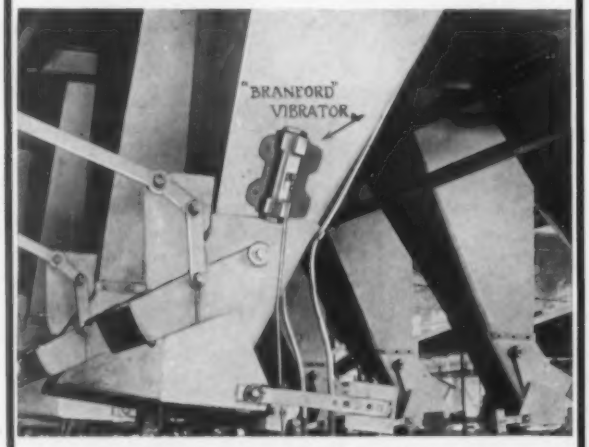

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Prevents costly damage to equipment by sledging; cuts down labor costs and increases production.
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USE RIGHT BUCKET FOR THE JOB
Hayward makes all four—clam shell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.
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MAIL TODAY— 37-17
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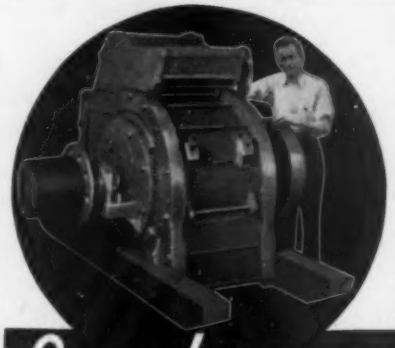

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Its wide crushing range makes it serve the purpose of two or more other types of crushers. Roller bearing equipped. Write for Bulletin.

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WOVEN WIRE SCREENS
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GRAVEL, sand, crushed rock and similar materials can be moved from pits, banks or stockpiles most cheaply with a Sauerman machine.

There is a double saving when you use a Sauerman machine. You keep down your equipment investment and your daily operating expense is lower than with any other equipment able to dig and haul an equal yardage. One man handles the entire operation. Capacities range from 10 to 600 cu. yd. per hour.

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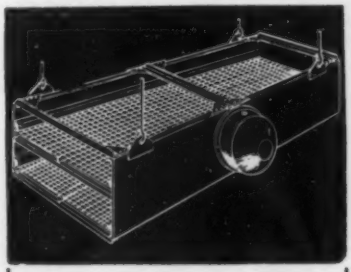

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5 DISTINCTIVE FEATURES . . .

1. Full Floating Shaft.
2. Eight Positive Stroke Adjustments (quickly changed).
3. Oil Lubricated.
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5. Screen Cloth Easily Changed.

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Productive Equipment Corp.
2326-28 West Lake St., Chicago, Ill.

Manufacturers' News

Cummins Engine Co., Columbus, Ind., has been awarded the Army-Navy "E" pennant for outstanding production of war materials.

The Babcock & Wilcox Co., New York, N. Y., announces the award of the Army-Navy "E" pennant to the company's works in Augusta, Ga., for outstanding production of refractories. Previously, the Navy "E," the Maritime "M" and the Army-Navy "E" had been awarded the Barberton, Ohio works.

Diamond Iron Works, Inc., and Mahr Mfg. Co. division dealers and representatives met recently in Minneapolis for the company's second annual sales conference. Nearly all of the Diamond-Mahr sales volume in 1942 was from the sale of its regular products which are all going indirectly into the war effort.

Robins Conveying Belt Co., Passaic, N. J., announces the appointment of John T. Hoyt as comptroller of the company and R. C. Gray as works manager.

Caterpillar Tractor Co., Peoria, Ill., has appointed James H. Deaderick as vice-president. Mr. Deaderick was formerly assistant general parts manager, and has been associated with the company since 1929.

W. W. Sly Mfg. Co., Cleveland, Ohio, has made Edwin S. Armstrong manager for the Milwaukee district, including the greater part of the State of Wisconsin. His headquarters are at 7936 Rogers Ave., Wauwatosa, suburb of Milwaukee.

Wickwire Spencer Steel Co., New York, N. Y., announces the appointment of Wilfred C. Shattuck as wire sales manager, with headquarters in the New York office. Mr. Shattuck returns to Wickwire after two years with John A. Roebling's Sons Co., first in their New York office and later as manager of sales, round wire, flat wire and specialties division, Trenton, N. J.

The Marion Steam Shovel Co., Marion, Ohio, has announced that Maurice V. Cornell and Ed. T. Bettels, former sales representatives, have enlisted in the U. S. Navy. Mr. Cornell has been commissioned a Lieutenant, j. g., and Mr. Bettels a Lieutenant in the U.S.N.R.

Caterpillar Tractor Co., Peoria, Ill., announces that the Army and Navy are conferring upon the men and women of the Peoria plant the Army-Navy "E" Award for high achievement in the production of war material.

The Bristol Co., Waterbury, Conn., announces the appointment of L. G. Bean to vice-president in charge of engineering and sales from the position of vice-president and general sales manager which he held since 1939. Harry E. Beane has been named sales manager and E. L. Stilson assistant sales manager. Their headquarters will be at the company's general offices in Waterbury, Conn.

The Buda Co., Harvey, Ill., announces the election of four new members to the board of directors: Harry A. Arthur, president of American International Corp. and also director of Interlake Iron Co. and Texas-Pacific Railroad; Henry C. Mackall of Stinchfield, Mackall, Crounse & Moore of Minneapolis; James D. Tew, formerly president of the Goodrich Tire and Rubber Co., and Howard A. Will of the firm of McDermott, Will & Emery, Chicago, attorneys for The Buda Co.

The Cooper-Bessemer Corp., Mount Vernon, Ohio, has transferred Philip W. Mettling, compressor expert, to their branch office at 640 East 61st Street, Los Angeles, Calif.

Joshua Hendy Iron Works, Sunnyvale, Calif., has acquired control of the Po-

Made of Acid Open Hearth Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
Established 1857
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Any SIZE
Any SHAPE
Any METAL
Any PERFORATION

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You can safely specify H & K screens and be assured of maximum screening results. Quality both in material and workmanship is always a first consideration.

Write for prices.

The Harrington & King Perforating Co.
5650 Fillmore St., Chicago—114 Liberty St., N. Y.

mona Pump Co., its subsidiary Westco Division, and the Crocker-Wheeler Electric Manufacturing Co.

Peerless Pump Division, Food Machinery Corp., Los Angeles, Calif., has appointed Dan R. Rankin as acting chief engineer of the company. Mr. Rankin has been associated with Peerless for the past five years and previously was assistant to the chief engineer.

The American Brake Shoe & Foundry Co., Chicago, Ill., announces the appointment of James R. Hewitt as vice-president of the American Manganese Steel Division.

Chicago Bridge & Iron Co., Chicago, Ill., reports that E. E. Michaels, manager at Birmingham, Ala., has been named chairman of the industrial salvage committee of Associated Industries of Alabama. Mr. Michaels succeeds Warren Whitney, manager of National Cast Iron Pipe, division of James B. Clow & Sons, who recently was elected association president.

The Marmon-Herrington Co., Inc., Indianapolis, Ind., announces that A. W. Herrington, chairman of the board of directors, has been elected a director of the Army Ordnance Association.

The Babcock & Wilcox Co., New York, N. Y., has announced the appointment of Leon E. Jeanneret, formerly assistant general sales manager, Beaver Falls, Penn., as manager of sales of the welded tube division, with general offices and plant at Alliance, Ohio. Edward A. Livingstone, general sales manager at Beaver Falls, Penn., will also be general sales manager of the welded tube division at Alliance, Ohio.

Hercules Powder Co., Wilmington, Del., announces the retirement of Gould Grant Rheuby from his positions as vice-president, director, and member of the finance committee. He had served the company since April 1, 1913, only three months after it had commenced business. Charles A. Bigelow, who is also a vice-president, has been elected to succeed Judge Rheuby on the finance committee. The resignation of Mr. Bigelow from the executive committee has also been announced.

American Manganese Steel Division of the American Brake Shoe & Foundry Co., Chicago, Ill., announces that J. L. McMullen, plant manager at New Castle, Del., is now directing the manufacture of armor steel castings for the war effort at the St. Louis plant.

Marmon-Herrington Co., Inc., Indianapolis, Ind., has announced a new organization setup whereby Bert Dingley, former executive vice-president, becomes president, and to assist him in carrying out his greater responsibilities the following vice-presidents have been elected by the Board of Directors: R. C. Wallace, vice-president in charge of engineering; Seth Klein, vice-president in charge of production; C. Alfred Campbell, vice-president in charge of public relations; George E. Reynolds, vice-president in charge of the Eastern district. To succeed D. I. Glossbrenner, who has resigned as secretary-treasurer to enter military service, William B. Nottingham was elected secretary, and H. DeBaun, treasurer of the company. John J. Klein, assistant to A. W. Herrington, who continues as active chairman of the board of directors, was elected assistant secretary, and L. M. O'Connor, assistant treasurer.

The B. F. Goodrich Co., Akron, Ohio, announces that C. B. "Scotty" Burmood, formerly chief pilot for Chiang Kai-shek, generalissimo of China, and a veteran pilot well known in international flying circles, is now a member of the company and in charge of flying operations. He will make his headquarters in Akron where the company's new airplane is based.

Chicago Pneumatic Tool Co., New York, N. Y., has appointed E. P. Barry as coordinator of plants, in which capacity he will supervise production methods, according to an announcement by H. A. Jackson, president of the company.

The Howe Scale Co., Rutland, Vt., announces that H. W. (Warren) Hem, one of the foremost engineers in the field of weighing, has joined the company as research director.

Fairbanks, Morse and Co., Chicago, Ill., has appointed Robert H. Morse, Jr., formerly branch manager at Cincinnati, Dallas and Boston, as assistant sales manager to A. C. Dodge, vice-president and sales manager. John Elmburg has been made manager of the Boston branch to fill the vacancy left by Mr Morse.

The B. F. Goodrich Co., Akron, Ohio, has named M. G. Huntington manager of the Company's Washington office of the national sales and service division. Mr. Huntington has been with the company since 1923.

George Haiss Mfg. Co., Inc., New York, N. Y., has appointed Harron, Rickard & McCone Co., San Francisco, Calif., as its San Francisco distributor. This company will handle the complete Haiss line including bucket loaders, snow loaders, clamshell buckets and portable conveyors.

New Incorporations

Scioto Lime and Stone Co., Scioto Township, Ohio, has been incorporated, with a capital of $100,000. Incorporators are Hugh M. Bennett, Jacqueline Douglas and Eleanor Ray.

Chazy Lime and Stone Co., Inc., Chazy, N. Y., has been organized for mining and quarrying, with a capital of $50,000. Andrew W. Ryan, Plattsburgh, N. Y. is the agent.

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We are proud of the fact that vital equipment—so necessary in the war production effort—has been procured through and by our organization for many of America's leading industrial firms.

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The January issue of Rock Products carried a comprehensive ***Directory of Suppliers.*** It has been a welcomed and useful aid to buyers in these days of difficulty in securing parts, supplies and equipment.

Suppliers are listed under classified product headings for quick and easy reference.

Extra copies of the ***Directory*** section were printed and are still available, while they last. Send for your copy now, if you don't already have one.

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Classified Advertisements

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1—Telesmith No. 6A Gyratory Crusher.
1—10½ D Acme Jaw Crusher, completely rebuilt with two new plates.
1—9½ D Acme Jaw Crusher.
1—Bucyrus Erie Crane Type G 2.
4 cylinder 80 H.P. Waukesha Engine, Caterpillar Type, used with 1⅝ cu. yard Clamshell Bucket. 50' boom. Now working, can be seen in operation.
2—150 H.P. Horizontal Boilers. No Firebox. Bricked in type.
1—Byron Jackson Deep Well Pump, capacity 1,000 G.P.M. Total pumping head of 165 ft. Complete with all piping to reach a well depth of 60 ft. Built in General Electric 60 H.P., 1750 R.P.M. 3 phase, 60 cycles, 220 volt motor. The above unit is guaranteed brand new.

All of above material located in New York City, any reasonable offer will be accepted.

Address Box A-100, c/o ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago, Ill.

FOR SALE
SAND AND GRAVEL DREDGE

250 hp. direct connected motor.
10" type C Morris pump, 12" suction.
35 hp. motor to drive rotary cutter.
15 hp. motor to drive 5 drum winch.
7½ hp. motor in mono block Worthington pump.
A frame and rotary cutter, 5 drum Sargent winch, etc.
All electrical equipment, such as, Grids, Switches, Starters, Fuse Boxes, Insulators, Controllers, etc.
Dredge hull 40'x20'x4' with superstructure.
Transformers LMC No. 74729 and 74780, 150 KVA 2400 to 220/440, 60 cycle oil cooled.
Pipe and fittings, electrical wiring, conduit, etc., on dredge.
Dredge located in Iowa and in dry dock. Inspection invited. Worth twice our asking price.

Write Box 864, Des Moines, Iowa.

CRUSHER, 936 Cedar Rapids plain bearing, late model, serial number 3440 series, with V belt drives, 12' x 24" belt discharge conveyor with shaft drive, all mounted on four steel wheels with 14" faces. In good condition. Can be inspected at our yard. Price F. O. B. car, $2900.00.

SHOVEL, 1¼ yd. Lima Model 101 crawler mounted, serial number 140 series, with Waukesha gasoline engine, in good operating condition. Price F. O. B. car Missouri shipping point, near St. Louis, $6000.00.

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1325 Mackland Ave. St. Louis, Mo.

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1 complete semi-portable crushing plant, consisting of a 36" primary jaw crusher, a 24" x 30" secondary roll crusher, a 150 ton Blaw Knox Steel Bin, Screens, elevator, conveyor and individual electric motors. Will crush 50 to 75 tons of material per hr. Complete in every respect. For further information, inquire, **Robert Totterdale, 1211 Wyandotte Rd., Columbus, Ohio**

FOR SALE

1—Jeffrey Hammermill Pulverizer 24x18, type A.
1—KB Hammermill Pulverizer 12x24.
1—Walker Elliott Rotary Type Crusher, reduces 8 to 10 inch lumps to ½ inch.
1—3x10 Vibrating Screen, triple deck, complete with motor and drive.
1—Storage bin, 8 ft. wide, 8 ft. deep, 13 ft., 6 in. long.

G. & W. H. CORSON
Plymouth Meeting, Pa.

FOR SALE

One (1) 150 H.P. Thomas Single Drum Electric Hoist. Drum 60" Dia., 36" Face, Grooved for 1" Cable, 8" Shaft, Brake Drum 67½" Dia., 9" Face—G. E. Emergency Brake. G. E. Slip Ring Motor, 150 H.P., 3 Ph., 60 C., 440 V., 720 R.P.M., Serial No. 5196349 with electric drum controller, disconnect switch, magnetic contactors and resistor bank all mounted on one frame 76"x13'6". Condition same as new.
One (1) 100 H.P. Flory Single Drum Hoist. Drum 48" Dia., 42" Face, Grooved for ⅞" Cable, 4⅜" Shaft, with Falk 9-D-A Reducer, 870 R.P.M., Ratio 11.5 to 1, and Westinghouse 100 H.P. Motor, 870 R.P.M., 60 C., 440 V., 3 Ph., A-1 Condition.
One (1) 8 Ton Plymouth Gas Locomotive, 36" Ga., Type 6, Model DLC., Condition A-1.
(22) 4 Yard Koppel Rocker Dump Cars—Condition good.
One (1)—36"x12' Stephens Adamson Apron Feeder, Style D.
One (1) Link Belt Apron Feeder, 8' Centers, 18" Wide with ¼" steel pans.
One (1) 18'x18" Jeffrey Apron Feeder.
One (1) Studebaker Dempster-Dumpster truck, 2½ ton Capacity, 1938 Model, complete with five boxes.
One (1) Diamond T Dempster-Dumpster truck, 2½ ton Capacity, 1938 Model, complete with five boxes.

THOMASVILLE STONE & LIME CO.
THOMASVILLE, PENNSYLVANIA

FOR SALE

Complete Ready-Mix Concrete Plant with Steam Heat, Capacity 100 cu. yds. Pre-Mixed Concrete per Hour, located near St. Paul, Minnesota. Now Working and Available April 1, 1943.

DESCRIPTION:

Aggregate Conveyor 228' Centers.
Four compartment Johnson Octagonal Bin with swivel distributor: Two compartments 35 cu. yd. capacity, two compartments 40 cu. yd. capacity.
Two Johnson Cement Storage Bins, 1600 cu. ft. capacity each.
One Link-Belt Cement Elevator, 80 ft. Centers.
One 9"x15' Link-Belt Cement Screw.
One 150-gal. No. 848 Water Tank.
Four 90-cu. ft. Johnson Measuring Hoppers (Aggregate).
One 36-cu. ft. Johnson Measuring Hopper (Cement).
Five Johnson Hopper Scales, Model 5000.
Four Toledo Dial Scales, 9000 lb. capacity (Aggregate).
One Toledo Dial Scale, 3000 lb. capacity (Cement).
One Ransome 84-S Mixer driven by 60-H.P. G. E. Ind. Motor.
One Curtis Air Compressor.
One 125-H.P. Scotch Marine Boiler, The James Liffel & Co.
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Browning 9-ton Truck Crane, 40' bm., 3 axle.
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American 60 ton, steam, std. ga.
American 50 ton, steam, Saddle Tank.
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Vulcan 16 ton, 36" gauge, gas.
Vulcan 8 ton, std. gauge, gas.
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3—30 ton Standard Gauge Flat Cars, rebuilt.

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1350' 25 lb. Rail, 36" gauge, on steel ties, straight sections 10 to 30' lengths.
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39—Various size Mortar Boxes.

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Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

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4—7 ton Plymouth type 2, Model D L 24" gauge locomotives power gasoline engines.
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1—7 ton Plymouth 24" gauge type 2 Model HL power gasoline engine.
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1—3 ton Whitcomb 24" gauge type U T gasoline power engines.

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1—No. 1 Brown hoist, Ser. No. 10271 with 35' boom.
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1—Mdl. 301 Koehring, Ser. No. 544, with 45' boom.

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1—1 yd. North-West 105.
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4—La Plante Choate all steel 2 door bottom dump wagons mtd. on 4 wheel trucks, capacity 19 tons.
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21 LeRoi, 2-cylinder, 8 HP, gasoline engines with clutches and power take-offs.

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18 Clinton 3½ cu. yd. Agitators
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1 Hayward 2-cu. yd. Reh. Clam Bucket

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1—Allis Chalmers 6" and 10" Superior.
1—Traylor 12" and 16" gyratory.
1—Symons 2' and 3' Cone Crushers, coarse bowl.

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CRUSHERS—JAW

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1—Traylor 18 x 42 double roll.
1—Link Belt 24 x 24 single roll coal crusher.
1—Sturtevant 14 x 20.
1—Allis Chalmers 24 x 54 double roll.

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1—Stiff Leg Derrick, 80' boom, 125 H. P., 3 drum, electric hoist with swinger, with or without 2 yd. capacity bucket.
1—55 ton all steel Stiff Leg Derrick, 50' boom, with or without 80 H.P. double drum electric hoist.

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1—7' x 55'.

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36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

TRANSMISSION BELTING
HEAVY-DUTY—FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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HEAVY DUTY
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16"	6	1/16"	1/16"
18"	6	1/16"	1/16"

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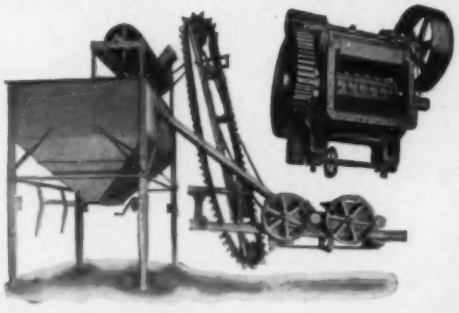

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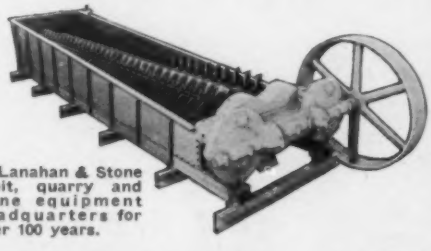

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American Cable TRU-LAY *Preformed*

...is a SAFER ROPE TO HANDLE

Believe it or not, industrial accidents cost the United States (last year) 37,500,000 forty-hour *weeks* of productive time. The interest of our national welfare demands that nothing be left undone to reduce this terrific toll. Look: that amount of productive time is enough to build 8 more battleships, plus 40 more destroyers, plus 3600 more bombers, plus 16,000 more tanks. It is your patriotic duty to do everything possible to protect yourself and others from accidents—that we may produce more weapons of victory.

One way many operators have reduced time-out accidents is through the adoption of American Cable TRU-LAY PREFORMED WIRE ROPE. American Cable TRU-LAY is a *safer* rope to handle because it is preformed. Being preformed, TRU-LAY is flexible, tractable, willing to do what is required of it without crankiness. It resists kinking and snarling and possesses remarkable fatigue-resistance. More than this, broken crown wires in TRU-LAY PREFORMED do not wicker out to jab and tear workmen's hands. That is one of the big reasons why TRU-LAY PREFORMED is a safer rope. For your next line, specify American Cable TRU-LAY PREFORMED. All American Cable ropes identified by the Emerald Strand are made of Improved Plow Steel.

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

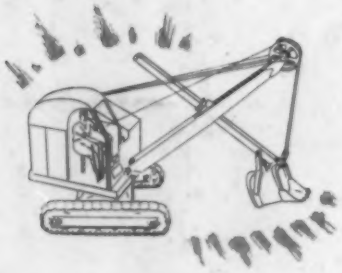
AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT, CONNECTICUT

ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

KEEP YOUR SHOVEL *DIGGING* FOR UNCLE SAM

Good maintenance is especially important today when new equipment is hard to get and existing equipment is called on for high-speed 3-shift service. Here are a few simple rules that may help keep your shovel digging more for longer:



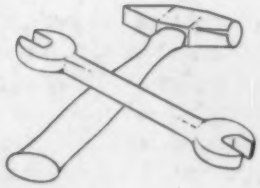
1. Lubricate regularly, following manufacturer's instructions carefully.

2. Keep machine clean.

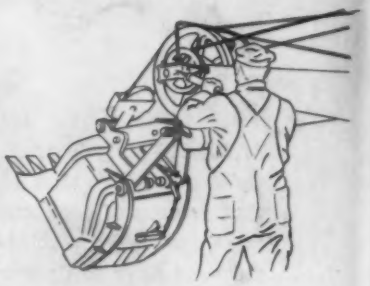
3. Keep fuel, lubricants and radiator water clean.

4. Inspect machine at least every 6 shifts and tighten any loose bolts.

5. Fix troubles while they're still little ones. Don't let them grow.



6. Try to lay out work and drainage so machine works on dry footing.



7. Do not "sweep" the pit by sideways dipper motion.

8. Do not start swing until dipper has been hoisted or retracted clear of bank.

ARMY E NAVY

Bucyrus-Erie employees have accepted the award of the Army-Navy "E" as a challenge to keep production rising. * *

Bucyrus-Erie

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